

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

## Volume 5 | Technical Appendices

CFA12 | Waddesdon and Quainton

**Survey reports (CH-004-012)**

Cultural heritage

November 2013

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Department  
for Transport

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# 1 Introduction

## 1.1 Structure of the cultural heritage appendices

- 1.1.1
- The cultural heritage appendices for the Waddesdon and Quainton community forum area (CFA12) comprise:

  - baseline reports (Volume 5: Appendix CH-001-012);
  - a gazetteer of heritage assets (Volume 5: Appendix CH-002-012);
  - an impact assessment table (Volume 5: Appendix CH-003-012); and
  - survey reports (this appendix).
- 1.1.2
- Maps referred to throughout the cultural heritage appendices are contained in the Volume 5, Cultural Heritage Map Book.
- 1.1.3
- Where appropriate, sites or assets discussed within this report have been cross referenced with the gazetteer of heritage assets (Volume 5: Appendix CH-002-012) and can be viewed on Maps CH-01-037b to CH-01-040a and CH-02-019 to CH-02-020-R1 in the Volume 5, Cultural Heritage Map Book.

## 1.2 Surveys undertaken

- 1.2.1
- This appendix contains the results of a series of archaeological surveys. These surveys comprise:

  - a fully-integrated remote sensing survey incorporating light detection and ranging (LiDAR), hyperspectral imagery and aerial photographic analysis of the majority of the Proposed Scheme; and
  - fieldwalking survey at one location along the route (site code: KBoAD(E)), encompassing approximately 6.2ha.
- 1.2.2
- No geophysical surveys were carried out within this study area.

### Surveys proposed but not undertaken

- 1.2.3
- Extra to the surveys reported on in this document, a number of additional locations within CFA13 were proposed for geophysical survey but due to access or other restrictions these surveys were not carried out. The locations of these proposed surveys are listed below:

  - Site AVoAH: area to the east of Glebe Farm, Waddesdon (NGR: SP 7494 1788);
  - Site AVoAG: area to the north of Waddesdon (NGR: SP 7431 1832); and
  - Site AVoAA: Doddershall and Woodlands Farm (NGR: SP 7243 2030).

# 2 Remote sensing survey report

## 2.1 Introduction

- 2.1.1
- This report outlines the results of the archaeological remote sensing survey of Waddesdon and Quainton study area. This was an archaeological survey involving the systematic analysis, interpretation, mapping and recording of archaeological sites from aerial photographs, hyperspectral imagery and LiDAR.
- 2.1.2
- The aim of the survey was to map and record the form and extent of archaeological features visible as cropmarks, soilmarks, earthworks or structures on a range of different remote-sensed imagery for the study area in order to inform the baseline assessment of the cultural heritage resource.
- 2.1.3
- The study area has not been covered by an English Heritage national mapping programme project. The Thames Valley national mapping programme project area<sup>1</sup> falls to the south-west; the area covered by the Hertfordshire national mapping programme project<sup>2</sup> lies to the east; and the Northamptonshire national mapping programme project<sup>3 4</sup> covered an area to the north. As such, there is no existing systematic survey of archaeological features visible on remote sensed sources for the Waddesdon and Quainton study area.

### The study area

- 2.1.4
- The study area for this remote sensing survey covered the entire length of CFA12, which falls entirely within Buckinghamshire.
- 2.1.5
- At the proposed vent shaft sites the study area generally comprised a 700m-wide strip centred on the Proposed Scheme (350m either side of the Proposed Scheme centre line). This provided a buffer sufficient to offer contextual information for recorded sites. Where the Proposed Scheme boundary extended beyond the edge of the 700m-wide strip the study area was expanded to the limit of the remote sensing survey boundary shown in Figures CH-004-12.01 to CH-004-12.09.
- 2.1.6
- In total, archaeological remote sensing survey for Waddesdon and Quainton study area covered an area of 7.4km<sup>2</sup>.

## 2.2 Methodology

- 2.2.1
- In order to provide consistency with other similar datasets (namely English Heritage national mapping programme mapping) the archaeological remote sensing survey was carried out in broad accordance with the current version of the English Heritage national mapping programme standards<sup>5</sup>. The interpretations applied to identified features are consistent with the preferred terms within the English Heritage Monument Type Thesaurus<sup>6</sup>.

<sup>1</sup> Fenner, V.E.P., (1994), *The Thames Valley Project: a report for the National Mapping Programme*, RCHME Aerial Survey Report Series.  
<sup>2</sup> Fenner, V.E.P., (1992), *Crop Marks in Hertfordshire: a report for the National Mapping Programme*, RCHME internal document.  
<sup>3</sup> Deegan, A., (1992), *Northamptonshire NMP Project: management report*, English Heritage and Northamptonshire County Council, Unpublished Report.  
<sup>4</sup> Deegan, A. and Foard, G., (2007), *Mapping Ancient Landscapes in Northamptonshire*, English Heritage, Swindon.  
<sup>5</sup> Winton, H., (2012), *Standards for National Mapping Programme projects, Version 0.1 Draft*, English Heritage, Aerial Investigation and Mapping, Typescript document.  
<sup>6</sup> English Heritage; NMR Monument Type Thesaurus ; [http://thesaurus.englishheritage.org.uk/thesaurus.asp?thes\\_no=1](http://thesaurus.englishheritage.org.uk/thesaurus.asp?thes_no=1); Accessed: August 2012–June 2013.

Sources: modern aerial photographs

- 2.2.2 High resolution (12.5cm) vertical aerial orthophotography taken specifically for the purposes of the project was made available for this survey. This imagery was captured during 2012. It generally consists of a 700m-wide strip centred on the route, although it is slightly wider in some areas. It was viewed digitally within a geographical information system (GIS) program. The level of accuracy of the orthorectification is such that features mapped from this source should be within 15cm of true ground position.
- 2.2.3 Pre-existing vertical aerial orthophotography dating from the 1990s and 2000s was also made available for this survey. This was supplied under the Pan-Government Agreement. The resolution is 25cm. The level of accuracy of the orthorectification is such that features mapped from this source should be within 1.5m of true ground position<sup>7</sup>. This vertical imagery was also viewed on-screen within GIS.

Sources: historic aerial photographs

- 2.2.4 All readily-available historic vertical and oblique aerial photographs held in archives were also consulted for this project. This included photographs held at the English Heritage Archive (formerly the National Monuments Record) and the Cambridge University Unit for Landscape Modelling. The latter is also referred to as the Cambridge University Collection of Aerial Photography.
- 2.2.5 The 146 historic vertical aerial photographs of the study area in the English Heritage archive (see Table 5) were taken for non-archaeological purposes between 1947 and 1999, by organisations such as the Royal Air Force (RAF) and the Ordnance Survey (OS). These photographs often captured sites of historic interest incidentally, especially those shots taken in the first half of the 20th century before archaeological remains may have been damaged or destroyed by the intensification of arable farming.
- 2.2.6 The 52 historic oblique aerial photographs of the study area in the English Heritage Archive (see Table 6) were taken between 1954 and 2007 and usually targeted known sites of architectural or archaeological interest. They were typically taken at a much larger scale than the 'blanket' vertical aerial photography, and were often timed to capture images of archaeological sites when they were at their most visible, i.e. when dry ground conditions favoured the development of clear cropmarks, or when low winter sun would reveal subtle earthworks.
- 2.2.7 The 62 historic vertical and oblique aerial photographs of the study area in the Cambridge University Collection of Aerial Photography archive (see Table 7) were taken between 1954 and 1999.
- 2.2.8 All aerial photographs in the English Heritage and Cambridge University Collection of Aerial Photography archives which fell within the study area were viewed in person and examined stereoscopically and under magnification where applicable. Copies were obtained where potential archaeological features were identified and the relevant photographs were considered to be of use either for transcription or for reference purposes.

Sources: LiDAR imagery

- 2.2.9 High resolution LiDAR data acquired specifically for the purposes of the project was made available for this survey. This data was captured in 2012. It generally consists of a 700m-wide strip centred on the Proposed Scheme although it is slightly wider in some areas.
- 2.2.10 The resolution of the data supplied was 20cm. The level of accuracy of the orthorectification was such that features mapped from this source should be within 15cm of true ground position. The raster digital elevation model was viewed directly within GIS. The digital elevation model is LiDAR data that has been processed to provide a representation of the ground surface without objects such as vegetation or buildings. This means that archaeological earthworks can be revealed on the LiDAR imagery even if they lie beneath areas of woodland<sup>8</sup>.

Sources: hyperspectral imagery

- 2.2.11 Hyperspectral imagery taken specifically for the purposes of the project was made available for this survey. This imagery was captured during a series of 'runs' in 2012 and provides a considerable buffer beyond the edge of the remote sensing survey study area boundary.
- 2.2.12 Hyperspectral imagery of the south-eastern end of the route had not been taken at the time of this survey. It was only available for the two northernmost proposed vent shaft locations.<sup>9</sup>
- 2.2.13 Thirty-four separate spectral band widths were captured, ranging from 406.075 nanometres to 992.065 nanometres. The band widths varied slightly between 16.280 nanometres at the lower end of the spectrum to 18.280 nanometres<sup>10</sup>. For each of the areas surveyed varying combinations of three different bandwidths were analysed, with particular reference to bands 7–13 (882.725 nanometres to 773.255 nanometres) and bands 18–22 (683.435 nanometres to 612.185 nanometres), as these have been shown previously to be useful in archaeological remote sensing<sup>11</sup>.
- 2.2.14 The hyperspectral imagery was viewed directly within GIS, as automated classification software does not work well with such high resolution data due to the prolifically varied response obtained from a single small area<sup>12</sup>.

Sources: historic environment record data

- 2.2.15 Data from the Buckinghamshire historic environment record (HER) was supplied for the survey. These records were used as a reference to aid interpretation of features visible on remote sensed imagery, either through a pre-existing identification of a visible feature, or by providing information that could help characterise the likely cultural heritage resource of the area.
- 2.2.16 The HER data was supplied as points, lines and polygons, with identifying attribute data attached. Full monument record reports were also supplied as a portable document format document. The data supplied covered the entirety of the Buckinghamshire area, creating an

<sup>7</sup> GeoStore; Aerial Photography RGB Product; <http://www.geostore.com/geostore4/WebStore?xml=geostore4/xml/productsAPRGB.xml>; Accessed: August 2013.

<sup>8</sup> This can sometimes depend upon the time of year that the LiDAR imagery was captured.  
<sup>9</sup> The proposed vent shafts are covered by runs 4a and 5b.  
<sup>10</sup> Blom, (2012), *HS2 Hyperspectral Information*, BLOM Project Number: 03/037/12.  
<sup>11</sup> Powlesland, D., Lyall, J. and Donoghue, D., (1997), *Enhancing the record through remote sensing: the application and integration of multi-sensor, non-invasive remote sensing techniques for the enhancement of the Sites and Monuments Record*. Internet Archaeology 2; <http://dx.doi.org/10.11141/ia.2.4>; Accessed: 18 December 2012.  
<sup>12</sup> Powlesland, D., Lyall, J. and Donoghue, D., (1997).

ample buffer to provide contextual information for any archaeological sites of interest within the boundary of the remote sensing study area.

Sources: national record of the historic environment data

- 2.2.17
- Monument data from the national record of the historic environment, held by English Heritage, was supplied for the survey. This data was used as a reference to aid interpretation of features visible on remote sensed imagery either through a pre-existing identification of a visible feature or by providing information that could help characterise the likely cultural heritage resource of the area.
- 2.2.18
- This data was supplied as points, lines and polygons with identifying attribute data attached. Full monument record reports were also supplied as a portable document format document. The data covered a 10km-wide strip (5km each side of the route centre line) thereby providing an ample buffer beyond the boundary of the remote sensing study area.

Sources: cartographic sources

- 2.2.19
- Historic OS mapping was supplied for the survey. The map tiles had been geo-referenced and were viewed digitally in GIS. Epochs 1–4 of the 1:2500 scale County Series maps, which typically date from 1898 onwards, were used as a reference to aid interpretation of features visible on the remote sensed imagery.
- 2.2.20
- In general, where features such as field boundaries, trackways, extractive pits or ponds were marked on historic OS maps, they were not mapped and recorded as part of this survey. This is because the objective of this project was to add to the known record not duplicate it. Nevertheless, where the full extent or form of a feature was not recorded in its entirety on the historic maps, it was included in the transcription for this project.

Interpretation, rectification and mapping

- 2.2.21
- All vertical and oblique images from the sources identified above were systematically examined for any archaeological features visible as cropmarks, soilmarks, earthworks or structures. In accordance with best practice for remote sensing surveys all available sources for each field or land parcel were viewed in conjunction in order to enable the most accurate interpretation possible.
- 2.2.22
- Where archaeological features were visible on the LiDAR or aerial orthophotography a detailed transcription, including all visible elements of the site in question, was carried out in ArcMap 10.1.
- 2.2.23
- Where additional sites, features or details were visible on the historic oblique or vertical aerial photographs from the English Heritage Archive and Cambridge University Collection of Aerial Photography, these images were rectified using the computer program Aerial 5.33 prior to their import into ArcMap for transcription.
- 2.2.24
- Digital OS MasterMap 1:1250 base maps were used to establish control points (it should be noted that even when 1:1250 scale data is obtained the scale of the mapping for rural areas is only in fact 1:2500<sup>13</sup>). Six or more control points were used for each photograph with errors

kept below 1m for each control point. This provided accuracy to within 1m to the base map for the rectified photographs.

- 2.2.25
- A digital terrain model (DTM) in the form of 5m point data was used in order to further refine the accuracy of the rectifications.
- 2.2.26
- The OS advise that their 1:1250 scale MasterMap data has an accuracy of 0.5m root mean square error for urban areas, and 1.1m root mean square error for rural areas.<sup>14</sup> Therefore, archaeological features transcribed from photographs rectified using this data will on average be accurate to within 1m–2m of their British national grid coordinates.
- 2.2.27
- As noted above, in order to ensure consistency with other similar remote sensing datasets, this project was carried out in broad accordance with current national mapping programme standards and guidance: the identified features were transcribed onto the standard national mapping programme drawing layers, using standard national mapping programme conventions<sup>15</sup> as detailed in Table 1.

Table 1: Layers used in GIS for digital transcription of archaeological features<sup>16</sup>

Layer name	Colour	Description
Bank	Red	Defines the outline of positive features such as boundary banks or windmill mounds. Thin banks, or those too diffuse to define accurately are included on this layer as a single line.
Ditch	Green	Defines the outline of negative features such as boundary ditches or hollow ways. Thin ditches, or those too diffuse to define accurately are included on this layer as a single line.
Large cut feature	Blue	Defines the outline of sizeable negative features such as quarries or extractive pits.
Levelled ridge and furrow outline or direction	Magenta	Defines the outline of a single block of ridge and furrow seen either as a cropmark, or an earthwork later known to have been levelled.  An arrow within each single block indicates the direction of ploughing.
Extant ridge and furrow outline or direction	Cyan	Defines the outline of a single block of ridge and furrow seen as earthworks on the latest available remote sensed imagery.  An arrow within each single block indicates the direction of ploughing.
Extent of area	Grey	Defines the extent of large features such as the perimeters of World War II airfields and military camps.
T-hachure	Dark blue	Top of the 'T' defines the top of a slope or scarp edge such as a lynchet or house platform. Body of the 'T' indicates the length and direction of the slope.
Structure	Purple	Defines the extent of surviving buildings and structures such as individual World War II Nissen Huts and pillboxes. Thin structures such as walls or concrete paths are included in this layer as a single line.

- 2.2.28
- Table 2 and Table 3 show period range and evidence range abbreviations used. The evidence abbreviations identify the form in which a feature is visible on the remote sensed imagery.

<sup>13</sup> Ordnance Survey; Products and Services FAQs: How accurate are your products?; <http://www.ordnancesurvey.co.uk/oswebsite/support/products-services.html>; Accessed: June 2013.

<sup>14</sup> Ordnance Survey; Products and Services FAQs: How accurate are your products?; <http://www.ordnancesurvey.co.uk/oswebsite/support/products-services.html>; Accessed: June 2013.

<sup>15</sup> Winton, H., (2012).

<sup>16</sup> Table 1 based on Winton, H., (2012), Section 7.5. P31.

2.2.29 Information relating to each of the transcribed features was recorded in the ArcMap attribute table. This included details such as the interpretation of each feature and the remote sensed source they were transcribed from, as well as the HER and national record of the historic environment numbers for the features if applicable. These results have been set out in Table 4 of this survey report.

Table 2: Period range abbreviations used in the GIS attribute data

Period	Abbreviation	Date range
Neolithic	N	4,000 – 2,200 BC
Bronze Age	BA	2,200 – 700 BC
Iron Age	IA	800 BC – AD 43
Roman	RO	AD 43 – 410
Early medieval	EM	AD 410 – 1066
Medieval	MD	AD 1066 – 1540
Post-medieval	PM	AD 1540 to 1901
20th century	C20	AD 1901 – 2000
World War II	WWII	1939 to 1945
Uncertain	UN	

Table 3: Evidence abbreviations used in the GIS attribute data

Evidence	Abbreviation
Cropmark (includes soilmarks)	C
Earthwork	E
Levelled earthwork	LE
Destroyed monument (i.e. quarried-away)	DM
Structure	S

2.2.30 The results of this remote sensing survey and transcription have been saved in the project ArcMap MXD and have been supplied with all of the additional required metadata attached. The results have also been exported as Esri shapefiles for ease of import into other GIS programs where necessary in compiling the baseline survey.

2.3 Limitations

- 2.3.1 In some areas, the 2012 LiDAR and aerial orthophotography did not cover the full extent of the Proposed Scheme.
- 2.3.2 Where archaeological sites have been identified solely from remote sensed imagery, without confirmation from archaeological excavation or supporting evidence in the form of find-spots,

etc., it should be noted that the interpretation may be revised in the light of further investigation.

2.3.3 It should be stressed that the absence of an archaeological feature on remote sensed imagery does not confirm its absence in the ground, as visibility from the air is sometimes dependent upon a complex combination of factors. These include:

- unsuitable conditions at the time of image capture (such as lighting, ground moisture content and crops or other ground cover);
- variable quality of photography;
- underlying features being masked by alluvial build-up; and
- areas where archaeological features either do not survive or have never existed.

2.3.4 During the survey 'steps' of approximately 2m were noted at several points in the purpose-flown 2012 vertical orthophotography where adjacent image tiles had been joined to provide continuous coverage of the Proposed Scheme. This issue was escalated as appropriate.

2.3.5 Archaeological features were not mapped beyond the boundary of the remote sensing survey study area, as the cumulative effect of this along the entire length of the Proposed Scheme would have resulted in a significant increase in the study area. Where archaeological cropmarks, earthworks, soilmarks or structures continued beyond the study area boundary, this was noted in the attribute data of the mapped feature.

2.3.6 The hyperspectral imagery obtained for the purposes of the project did not include spectral bands in the short-wave to mid-infrared/thermal wavelengths (2,080 nanometres –13,000 nanometres), which have been shown in the past to be of particular use in assessing archaeological potential. The mid-infrared/thermal range is especially likely to reveal subtle cropmarks or soilmarks that are not strong enough to be detectable in the visible part of the spectrum due to the fact it will display very slight differences in water content present within both vegetation and the ground<sup>17</sup>.

2.4 Assumptions

2.4.1 Information on the positional accuracy of the hyperspectral imagery has not been supplied. As such it is assumed that the accuracy of the orthorectification of this source is at least as good as that of the Aerial 5.33 program outlined in Section 2.2.21 of this report – i.e. transcribed features will be accurate to within 1m–2m of true ground position. Reference should be made to the note in Section 2.3.4 of this report, however, regarding the 2m 'step' observed in some locations.

2.5 Results: description

2.5.1 The primary output of the archaeological remote sensing survey of Waddesdon and Quainton study area was the detailed digital transcription of each identified potential archaeological feature. Information pertaining to the interpretation of these features is contained within the attribute data of every line and polygon drawn in GIS.

<sup>17</sup> Powlesland, D., Lyall, J. and Donoghue, D., (1997).



- 2.5.2 Table 4 itemises in detail the results of the Waddesdon and Quainton study area survey. These details originate from the GIS attribute data. The results should be read in conjunction with Figures CH-004-12.01 to CH-004-12.09 of this report.
- 2.5.3 Where a single mapped feature has generated two lines of identical attribute data<sup>18</sup>, the duplicate line has been removed from Table 4. Where the transcription of a site or feature consists of several lines or polygons which may have been visible on different sources, or in a different form (i.e. where different elements of the site are visible as both cropmarks and earthworks), the differing lines of the attribute data table have been retained in order to reflect these variations.
- 2.5.4 The Aerial Survey ID is the unique identification applied to each site or feature transcribed during this project. It was not considered sufficient to use the automatically generated 'feature ID' within GIS, as this would result in a site which consisted of several different features represented by different lines and polygons having several different identifying numbers. The Aerial Survey ID was also used to group features, such as several interconnecting fields of ridge and furrow. This is consistent with the approach taken by English Heritage on national mapping programme projects<sup>19</sup>. The Aerial Survey ID is prefixed with a different sequential letter for each CFA. For CFA12 it is the letter 'L'.
- 2.5.5 The national record of the historic environment and HER columns detail the relevant monument numbers for these authorities, where such numbers exist for transcribed features. The HER reference quoted is the 'Pref Ref' rather than the Monument Number.
- 2.5.6 The Period abbreviations used are set out in Table 2.
- 2.5.7 As noted in Section 2.3 of this report, the interpretation types (given in the Type column) comply with the preferred terms within the English Heritage Monument Type Thesaurus<sup>20</sup> in order to achieve consistency with other similar transcribed datasets.
- 2.5.8 The Evidence abbreviations refer to the physical nature of the recorded features. These abbreviations are set out in Table 3.
- 2.5.9 The remote sensed imagery used to transcribe each individual feature is detailed in the Source column.
- 2.5.10 The Description column is intended as a brief interpretation only, outlining the main features or points of note.
- 2.5.11 The full attribute table attached to every line and polygon transcribed as part of this survey contains additional columns not displayed in Table 4, such as the date the feature was transcribed and the initials of the member of staff responsible, etc.

<sup>18</sup> Such as a block of ridge and furrow, which contains this information within both the polygon that defines its extent and the line indicating the direction of ploughing.

<sup>19</sup> Winton. H., (2012).

<sup>20</sup> English Heritage, *NMR Monument Type Thesaurus*.

Table 4: Exported GIS attribute data for each transcribed feature, detailing the interpretation applied.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
Lo1 (WAD001)	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-CPE-UK-2159 3040 13-JUN-1947	Levelled ridge and furrow is faintly visible as cropmarks on vertical aerial photographs of 1947. Continues across the rest of this field to the south, but not mapped there as it is beyond the project boundary.
					E	HS2 LiDAR 2012	Ridge and furrow earthworks clearly visible on LiDAR.
					E	HS2 LiDAR 2012	Ridge and furrow earthworks clearly visible on LiDAR. Cut across at several points by later field drains, one of which forms a linear bank leading to the pond in the western corner of the field.
					E	HS2 LiDAR 2012	Ridge and furrow earthworks clearly visible on LiDAR. The western corner of the field is covered by a small area of woodland, but the LiDAR reveals ridge and furrow earthworks continuing beneath it.
					E	HS2 LiDAR 2012	Ridge and furrow earthworks visible on LiDAR in the northernmost corner of a field. Likely to continue across the rest of the field to the south, but this area is not mapped as it is beyond both the project boundary and the edge of the LiDAR coverage.
					E	Pan-Government Agreement SP7616 13-JUN-2003 / HS2 LiDAR 2012	Ridge and furrow earthworks visible in the garden or paddock to the north of Cranwell Farm. Very clearly extant on the aerial photograph of 2003; only just faintly extant on LiDAR of 2012. Northern end best preserved in 2012.
					E / LE E	NMR RAF-58-4627 0409 16-AUG-1961 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 1961 appear to have been levelled by the time the 2012 LiDAR. Continue to south, but not mapped beyond the project boundary.
						HS2 LiDAR 2012	Very poorly preserved ridge and furrow earthworks faintly visible across two fields to the north of Cranwell Farm.
					E	HS2 LiDAR 2012	Very poorly preserved ridge and furrow earthworks faintly visible across two fields to the north of Cranwell Farm. Cut in half by the remains of a field boundary marked on early OS maps which has since been removed.
Lo2	n/a	n/a	MD / PM / UN	Trackway/natural feature	C / E	Pan-Government Agreement SP7517 13-JUN-2003 / HS2 LiDAR 2012	A slightly sinuous linear ditch is visible as a cropmark on aerial photographs and as a very slightly extant earthwork on LiDAR. Possible former trackway. Not recorded on historic OS maps. May alternatively be the course of a dried-up stream.
Lo3 (WAD123)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	A small area of ridge and furrow earthworks visible in the northern corner of a field. Likely to continue across the rest of the field to the south, but this area is not mapped as it is beyond the edge of both the project boundary and LiDAR coverage.
					E	HS2 LiDAR 2012	An area of ridge and furrow earthworks visible on LiDAR.
					C	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985	Levelled ridge and furrow is visible in this field as cropmarks on vertical aerial photographs of 1985. Continues across the rest of the field to the north, but not mapped beyond the project boundary.
					C	Pan-Government Agreement SP7517 13-JUN-2003	Ridge and furrow cropmarks faintly visible on vertical aerial photographs of 2003.
					E	HS2 LiDAR 2012	Ridge and furrow is just visible as faintly extant earthworks in the paddocks to the west of Wayside Farm.
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow earthworks visible in a field north-east of Glebe Farm.
					E	HS2 LiDAR 2012	Ridge and furrow earthworks visible in the field to the east of Glebe Farm. Preservation is variable.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 1985. Appear to have been levelled by the time of 2012 LiDAR.
					C	HS2 Vertical Photography SP7517 2012	Ridge and furrow cropmarks on two different alignments are visible on vertical aerial photographs of 2012 across a field to the north of Briar Hill Farm.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
					E / LE	NMR OS-76043 071 29-APR-1976 / HS2 LiDAR 2012	Ridge and furrow earthworks was visible on vertical aerial photographs of 1976 appear to have been levelled by the time of the 2012 LiDAR.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks very faintly visible on a vertical aerial photograph of 1985 appear to have been levelled by the time of 2012 LiDAR.
					C	Pan-Government Agreement SP7517 13-JUN-2003	Ridge and furrow earthworks visible on a 1945 vertical aerial photograph can be seen as a cropmark on an aerial photograph of 2003.
					C	Pan-Government Agreement SP7517 13-JUN-2003	Ridge and furrow earthworks visible on a 1945 vertical aerial photograph can be seen as a cropmark on an aerial photograph of 2003. Appear to overlie an earlier field boundary bank which remains as an earthwork due to its original greater height.
Lo4 (WAD011)	n/a	n/a	MD	Field boundary/plough headland	E	HS2 LiDAR 2012	A linear bank aligned south-west/north-east is visible on LiDAR as a subtle, plough-spread earthwork within an arable field. Not recorded on historic OS maps. Overlain by later ridge and furrow, which is now levelled (Lo3).
Lo5 (WAD124)	n/a	n/a	MD / PM	Field boundary/boundary bank	E	HS2 LiDAR 2012	A possible former field boundary bank is visible on LiDAR as a faintly extant earthwork. Likely to continue northwards beyond the edge of the LiDAR coverage. The considerable width of this earthwork is likely to be due to centuries of plough-spread.
							A possible former field boundary ditch of considerable width is visible on LiDAR as a subtly extant earthwork. Not recorded on historic OS maps. May have been associated with a hedgerow or field boundary bank.
Lo6 (WAD039)	342718	0033300000 0033301000	MD / PM	Moat/windmill mound	E	HS2 LiDAR 2012	Circular mound surrounded by a ditch. Recorded previously as a Bronze Age round barrow, a medieval moated site, a post-medieval windmill mound and a Civil War defensive site. Cut on south-east side by modern farm track. Mapped on 1st edition OS map of 1899 in its entirety.
Lo7 (WAD063)	342837	0034303000	MD	Deserted settlement	E	HS2 LiDAR 2012	Deserted settlement consisting of possible toft and croft boundaries, hollow ways and house platforms all visible as earthworks on 2012 LiDAR. Picture greatly confused by possible later drainage channels.
Lo8 (WAD063)	342837	0034303000	MD	Pillow mound	E	HS2 LiDAR 2012	A possible pillow mound is visible as an oblong/rectangular bank flanked by a ditch on either side. Situated between Dodershall House and the remains of the deserted medieval village to the north.
Lo9	n/a	n/a	MD / PM	Ridge and furrow	C	Pan-Government Agreement SP7018 13-JUL-2003	Ridge and furrow cropmarks visible in the southern corner of this field. Continue across the remainder of this field to the north, but not mapped beyond the project boundary.
L10 (WAD083)	n/a	n/a	MD / UN	Ditched enclosure/boundary ditch	C	Pan-Government Agreement SP7121 16-JUN-2003 / HS2 Hyperspectral 2012 (Run 10a Bands 7, 8, 9)	A possible ditched enclosure or field boundary ditch is visible on aerial photographs and LiDAR as a rectilinear cropmark. May be associated with medieval pond to north-east (NRHE 342861).
L11 (WAD083)	n/a	n/a	MD / UN	Drainage ditch/moat/natural feature	E	HS2 LiDAR 2012	A substantial curvilinear ditched feature of uncertain origin. Considerable width suggests it may be a moat, but it may also be agrarian in origin.
L12 (WAD127)	n/a	n/a	MD / PM	Field boundary/boundary bank	E	Pan-Government Agreement SP7219 13-JUL-2003 / NMR SP7219-2 NMR 24807-48 06-NOV-2007	A former field boundary bank is visible on vertical aerial photographs of 2003 and oblique aerial photographs of 2007 as both a cropmark and an earthwork respectively. Confirmed by LiDAR. Not on historic OS maps.
L13 (WAD122)	n/a	n/a	PM	Windmill mound	E	Cambridge University Collection of Aerial Photography RC8HI215 12-MAR-1985 / HS2 LiDAR 2012	A possible windmill mound is visible as an earthwork on both aerial photographs and LiDAR. Interpretation uncertain. Slight hollow on the eastern side of the mound may indicate that it is the spoil heap for an extractive pit or quarry.
L14 (WAD068)	n/a	n/a	PM	Windmill mound	E	NMR CAP-ZKNHN 117 14-JAN-1999	Substantial oval-shaped mound visible on vertical aerial photographs of 1999; tree-covered on earlier photographs. Possible windmill mound.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
L15	n/a	n/a	MD / PM	Ridge and furrow	C	Cambridge University Collection of Aerial Photography RC8Hl215 12-MAR-1985	Levelled ridge and furrow is very faintly visible as cropmarks on vertical aerial photographs of 1985. Continues across the rest of the field to the north, but not mapped beyond the project boundary.
					C	NMR RAF-541-273 3040 21-JUN-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
					C	NMR RAF-541-340 3005 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
					C	NMR RAF-541-272 4268 21-JUN-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks. Continues into the north-east corner of the field, but not mapped beyond the project boundary.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow very faintly visible as earthworks on a vertical aerial photograph of 1985 appear to have been levelled by the time of 2012 LiDAR.
L16 (WAD125)	n/a	n/a	MD / PM	Ridge and furrow	C	HS2 Vertical Photography SP7417-7418 2012	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2012.
					C	HS2 Vertical Photography SP7418 2012	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2012. Likely to continue across remainder of this field to the north-east, but not mapped beyond project boundary.
					C	NMR OS-76043 091 29-APR-1976	Levelled ridge and furrow is visible as cropmarks on vertical aerial photographs of 1976.
					C	HS2 Hyperspectral 2012 (Run 10a Bands 20, 21, 22) / HS2 LiDAR 2012	Possible levelled ridge and furrow is visible as cropmarks on hyperspectral imagery. 2012 LiDAR confirms this ridge and furrow does not survive as earthworks.
					E	HS2 LiDAR 2012	Ridge and furrow is very faintly visible as extant earthworks on LiDAR.
					E	HS2 LiDAR 2012	Poorly-preserved ridge and furrow earthworks visible in a field to the north-east of Glebe Farm.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks visible in two different alignments across this field on vertical aerial photograph of 1985. Appears to have been levelled by LiDAR of 2012.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow very faintly visible as earthworks on a vertical aerial photograph of 1985 appear to have been levelled by the time of 2012 LiDAR.
L17 (WAD125)	n/a	n/a	MD / PM	Ridge and furrow	C	Pan-Government Agreement SP7418 13-JUL-2003	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2003.
					C	NMR OS-75312 174 05-JUL-1975	Levelled ridge and furrow is visible as cropmarks on vertical aerial photographs of 1975.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as slightly extant earthworks across this field.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH050 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks very faintly visible on a vertical aerial photograph of 1985 appear to have been levelled by the time of 2012 LiDAR.



Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
L18 (WADo26)	n/a	n/a	MD / PM	Field boundary/plough headland	E	HS2 LiDAR 2012	A possible field boundary and/or plough headland is visible on LiDAR as a curvilinear earthwork. Not recorded on historic OS maps. Ridge and furrow abuts either side of this feature's western half, and runs over the top of its eastern half.
				Field boundary/plough headland	E	HS2 LiDAR 2012	A possible former field boundary or plough headland is visible on LiDAR as a linear earthwork. Not recorded on historic OS maps.
				Field boundary/plough headland	E	HS2 LiDAR 2012	A possible former field boundary or plough headland is visible on LiDAR as a linear earthwork. Not recorded on historic OS maps. Appears to have been cut by a later phase of ridge and furrow, which is also still extant.
				Field boundary/plough headland	E	HS2 LiDAR 2012	Possible former field boundaries or plough headlands are visible on LiDAR as linear earthworks in this field. Not recorded on historic OS maps.
				Ridge and furrow	C	Pan-Government Agreement SP7418 13-JUL-2003	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2003. Truncated by a gas pipeline.
				Ridge and furrow	C	HS2 Vertical Photography SP7318 2012	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2012.
				Ridge and furrow	E	HS2 LiDAR 2012	Two overlying phases of ridge and furrow earthworks visible in LiDAR. The two phases run on different alignments.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible as earthworks on LiDAR. A variety of alignments are visible in this field. Preservation variable.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible as earthworks on LiDAR. A variety of alignments are visible in this field. Preservation variable. This area of ridge and furrow has been bisected by a modern gas pipeline.
				Ridge and furrow	E	HS2 LiDAR 2012	Two different alignments of ridge and furrow are visible on LiDAR as earthworks. This area of ridge and furrow appears to have been cut by a modern drainage ditch.
				Ridge and furrow	E	HS2 LiDAR 2012	Two different alignments of ridge and furrow are visible on LiDAR as earthworks. This area of ridge and furrow appears to overlie a boundary bank or plough headland.
				Ridge and furrow	E	HS2 LiDAR 2012	Well-preserved ridge and furrow is clearly visible on LiDAR as extant earthworks across this field. The north-west corner of the field is covered by a small area of woodland, but the earthworks are visible beneath the trees on the LiDAR.
L19	n/a	n/a	MD / PM	Ridge and furrow	E / LE	NMR RAF-58-876 4013 21-MAY-1952 / HS2 LiDAR 2012	Ridge and furrow visible as a small patch of extant earthworks on vertical aerial photographs of 1952 had been built over by the time of the 2012 LiDAR.
L20 (WADo26)	n/a	n/a	MD / PM	Ridge and furrow	C	HS2 Vertical Photography SP7318 2012	Levelled ridge and furrow is visible across this field as cropmarks on vertical aerial photographs of 2012.
					C	Pan-Government Agreement SP7381 13-JUL-2003	Levelled ridge and furrow is visible as cropmarks in this field. Continues across the rest of the field to the south-west, but not mapped beyond the project boundary.
					E	HS2 LiDAR 2012	Ridge and furrow is clearly visible on LiDAR as well-preserved earthworks across this field.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH101 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow is visible here on vertical aerial photographs of 1985 as earthworks. Appears to have been levelled by the time of 2012 LiDAR. Originally continued southwards across the rest of the field, but not mapped past the project boundary.
					E	Pan-Government Agreement SP7381 13-JUL-2003	Ridge and furrow is visible on aerial photographs as extant earthworks across this field. Not mapped beyond the project boundary.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as earthworks within this field. Bisected by a modern gas pipeline.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as earthworks within this field. Preservation is variable, with the earthworks

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
							being slightly more degraded in the centre of the field.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as extant earthworks at the northern end of this field; continues on the far side of the road.
					E / DM	Pan-Government Agreement SP7318 13-JUL-2003 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 2003; now destroyed by gas pipeline.
L21 (WAD038)	n/a	n/a	MD / PM	Field boundary/boundary bank	E	HS2 LiDAR 2012	A possible former field boundary bank is visible on LiDAR as a linear earthwork. Not recorded on historic OS maps.
				Ridge and furrow	C	HS2 Vertical Photography SP7319 2012	Ridge and furrow is visible as cropmarks on vertical aerial photographs of 2012, running on two different alignments across this field.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible as earthworks across this field. Cut at two different points by two separate gas pipelines.
				Ridge and furrow	E	Pan-Government Agreement SP7318 13-JUL-2003	Ridge and furrow is visible as earthworks on vertical aerial photographs of 2003.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible as earthworks on LiDAR.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible as well-preserved earthworks on LiDAR.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow earthworks are visible in the corner of this field on LiDAR.
				Ridge and furrow	C	Pan-Government Agreement SP7318 13-JUL-2003	Ridge and furrow is visible on vertical aerial photographs of 2003 as cropmarks within this field. Continues north-west across the rest of the field, but not mapped beyond the project boundary.
				Ridge and furrow	C	HS2 Hyperspectral 2012 (Run 5a Bands 7, 8, 9)	Ridge and furrow visible on 1940s vertical aerial photographs as earthworks is visible on hyperspectral imagery of 2012 as cropmarks.
				Ridge and furrow	E / DM	Pan-Government Agreement SP7318 13-JUL-2003 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 2003; now destroyed by gas pipeline.
				Ridge and furrow	E	HS2 LiDAR 2012	Well-preserved ridge and furrow is visible on LiDAR as earthworks across this field. The eastern end is beneath trees, but the earthworks are visible on LiDAR beneath the area of woodland.
L22 (WAD032)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	A small area of well-preserved ridge and furrow is visible as earthworks on LiDAR in the easternmost corner of this field.
							Possible ridge and furrow is visible as earthworks on LiDAR. The wide and flat appearance of the ridges may be due to this area being re-used as allotments (marked on 2nd ed OS map of 1920), which would have been set out along the ridges.
							Well preserved ridge and furrow is visible as earthworks on LiDAR.
							Well-preserved ridge and furrow earthworks visible across this field on LiDAR.
L23 (WAD033)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	A small patch of poorly-preserved ridge and furrow is just visible beneath trees on LiDAR.
					C	HS2 Hyperspectral 2012 (Run 5a Bands 7, 8, 9)	Ridge and furrow is visible on hyperspectral imagery as cropmarks within this field. Continues northwards across the rest of the field, but not mapped beyond project boundary.
					E	HS2 Hyperspectral 2012 (Run 5a Bands 20, 21, 22)	Ridge and furrow is visible on hyperspectral imagery as earthworks at the southern end of this field. Continues across the rest of the field to the north, but not mapped beyond the project boundary.
					C	Pan-Government Agreement SP7319 13-JUL-2007	Ridge and furrow is visible on vertical aerial photographs of 2003 as cropmarks within this field. Continues northwards across the rest of the field but not mapped beyond project boundary.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow is visible as earthworks on LiDAR.
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow earthworks visible across this field on LiDAR.
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow earthworks visible on LiDAR across this field. Likely to continue across the rest of the field to the north but not mapped beyond project boundary.
L24 (WAD126)	n/a	n/a	MD / PM	Field boundary/boundary bank	E	HS2 LiDAR 2012	Two sections of extant linear bank are visible on LiDAR. Possibly field boundary banks associated with the ridge and furrow on their western sides.
				Ridge and furrow	E	HS2 LiDAR 2012	A small area of ridge and furrow is visible on LiDAR as faintly extant earthworks in this field west of Upper South Farm.
				Ridge and furrow	C	Cambridge University Collection of Aerial Photography RC8HH101 06-MAR-1985	Levelled ridge and furrow is visible on vertical aerial photographs of 1985. Appears to overlie an earlier boundary bank (L12) which remains partially extant even after the ridge and furrow has been levelled.
				Ridge and furrow	E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as faintly extant earthworks across two paddocks west of Upper South Farm.
L25 (WAD043)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	Well-preserved ridge and furrow earthworks visible across this field on LiDAR. Cut at two separate points by later field boundaries (recorded on historic OS maps and not mapped by the current survey) and field drains. Ridges and furrows themselves are very well-preserved.
							Ridge and furrow is visible on LiDAR as earthworks within this field. Variable preservation.
							Well-preserved ridge and furrow earthworks on two alignments visible across this field on LiDAR.
L26 (WAD128)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	A small area of poorly-preserved ridge and furrow is visible on LiDAR as earthworks in the corner of the field.
						NMR RAF-541-479 3238 07-APR-1950 / HS2 LiDAR 2012	Faint ridge and furrow earthworks visible on LiDAR and 1950 vertical aerial photograph.
						HS2 LiDAR 2012	Ridge and furrow is just visible on LiDAR as very faintly extant earthworks across this field.
						HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as earthworks across this field. Three different alignments are visible.
						HS2 LiDAR 2012	Well-preserved ridge and furrow earthworks visible on LiDAR across this field. Cut at several points by later field boundaries (recorded on historic OS maps and not mapped by this survey) and field drains.
L27 (WAD044)	n/a	n/a	MD / PM	Ridge and furrow	C	Pan-Government Agreement SP7319 13-JUL-2003	Levelled ridge and furrow is visible as cropmarks on vertical aerial photographs of 2003.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as well-preserved earthworks within this field.
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow is visible on LiDAR of 2012 as earthworks.
L28 (WAD044)	n/a	n/a	MD / PM	Ridge and furrow	E	HS2 LiDAR 2012	A small area of ridge and furrow is visible on LiDAR as earthworks. Between two diverging railway lines (one dismantled) and obscured at one point by a later field boundary bank that is still extant on 1940s aerial photographs.
					C	NMR RAF-CPE-UK-2483 3267 10-MAR-1948	Levelled ridge and furrow is faintly visible on vertical aerial photographs of 1948 as cropmarks.
					E	HS2 LiDAR 2012	Ridge and furrow is just visible on LiDAR as very faintly extant earthworks across this field.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as earthworks within this field. Truncated within its western half by later drainage or boundary ditch.
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as extant earthworks. Two slightly different alignments visible.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
					E	HS2 LiDAR 2012	Ridge and furrow is visible on LiDAR as extant earthworks. Two slightly different alignments visible. Truncated by later drainage ditches on western side.
					E	HS2 LiDAR 2012	Well-preserved ridge and furrow is visible on LiDAR of 2012 as earthworks.
L29	n/a	n/a	MD / PM	Ridge and furrow	E / C	HS2 LiDAR 2012 / PGA SP7220 13-JUL-2003	A field of ridge and furrow is only just faintly visible as earthworks on LiDAR; quite clearly visible as cropmarks.
					C	NMR RAF-541-340 3100 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
					E / LE	NMR RAF-58-4627 0367 16-AUG-1961 / HS2 LiDAR 2012	Ridge and furrow faintly visible as extant earthworks on vertical aerial photographs of 1961; appears to have been levelled by the time of the 2012 LiDAR.
L30	n/a	n/a	MD / PM	Ridge and furrow	E / C	HS2 LiDAR 2012 / PGA SP7220 13-JUL-2003	A field of ridge and furrow is faintly visible as earthworks on LiDAR; quite clearly visible as cropmarks.
L31	n/a	n/a	MD / PM	Ridge and furrow	C	HS2 Vertical Photography SP7121 2012	Levelled ridge and furrow is faintly visible in this field as cropmarks on vertical aerial photographs of 2012.
					E	HS2 LiDAR 2012	Ridge and furrow is very faintly visible as subtle earthworks within this field. Originally one large rectangular field, which was later bisected south-east/north-west by the railway line.
					C	HS2 Vertical Photography SP7121 2012	Ridge and furrow is visible on vertical aerial photographs of 2012 as cropmarks.
L32	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-479 4240 07-APR-1950	Cropmarks of levelled ridge and furrow are visible on vertical aerial photographs of 1950. They have the characteristic wavy appearance indicative of ridge and furrow earthworks in the process of being ploughed-out.
					C	NMR OS-76043 238 29-APR-1976 / NMR CAP-ZKNHN 099 14-JAN-1999	Levelled ridge and furrow is very faintly visible as cropmarks on vertical aerial photographs of 1976 and 1999.
					C	NMR CAP-ZKNHN 099 14-JAN-1999	Levelled ridge and furrow is very faintly visible as cropmarks on vertical aerial photographs of 1999.
					C	NMR RAF-541-479 4277 07-APR-1950	Levelled ridge and furrow is visible on vertical aerial photographs of 1950 as cropmarks.
					C / DM	Cambridge University Collection of Aerial Photography RC8HH164 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow cropmarks visible on vertical aerial photographs of 1985 as cropmarks; now destroyed by creation of a lake.
L33	n/a	n/a	MD / PM	Ridge and furrow	C	Cambridge University Collection of Aerial Photography RC8HH212 06-MAR-1985	Levelled ridge and furrow is very faintly visible as cropmarks on vertical aerial photographs of 1985.
					E / LE	NMR RAF-541-479 4240 07-APR-1950 / HS2 LiDAR 2012	Ridge and furrow is visible on vertical aerial photographs of 1950 as earthworks. Apparently levelled by the time of the 2012 LiDAR.
					E / LE	NMR RAF-541-479 4240 07-APR-1950	Ridge and furrow is visible on vertical aerial photographs of 1950 as earthworks. Apparently levelled by the time of the 2012 LiDAR.
L34	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-340 4103 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
					E / LE	NMR RAF-58-4627 0369 16-	Ridge and furrow earthworks visible on vertical aerial photographs of 1961; apparently levelled by the 2012 LiDAR.

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
						AUG-1961 / HS2 LiDAR 2012	
L35	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-479 4279 07-APR-1950	Levelled ridge and furrow is visible on vertical aerial photographs of 1950 as cropmarks.
					E / LE	Cambridge University Collection of Aerial Photography RC8HH210 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks visible across this field on vertical aerial photographs of 1985; apparently levelled by the time of the 2012 LiDAR.
L36	n/a	n/a	MD / PM	Ridge and furrow	E / LE	Cambridge University Collection of Aerial Photography RC8HH210 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks visible across this field on vertical aerial photographs of 1985; apparently levelled by the time of the 2012 LiDAR.
L37	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-479 4240 07-APR-1950 / HS2 LiDAR 2012	Ridge and furrow is visible on vertical aerial photographs of 1950 as cropmarks. Apparently truncated by a footpath.
					C	NMR RAF-541-479 4240 07-APR-1950	Ridge and furrow is visible on vertical aerial photographs of 1950 as cropmarks. Apparently truncated by a footpath.
					E / DM	NMR OS-75312 057 05-JUL-1975 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 1975; destroyed by a clay pit by the time of the 2012 LiDAR.
					E / DM	Cambridge University Collection of Aerial Photography RC8HH210 06-MAR-1985 / HS2 LiDAR 2012	Ridge and furrow earthworks visible on vertical aerial photographs of 1985; destroyed by a clay pit by the time of the 2012 LiDAR.
L38	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-340 4103 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
L39	n/a	n/a	MD / PM	Ridge and furrow	C	NMR OS-76043 240 29-APR-1976	Levelled ridge and furrow is visible on vertical aerial photographs of 1976 as cropmarks.
L40	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-340 3101 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
L41	n/a	n/a	MD / PM	Ridge and furrow	C	NMR RAF-541-340 3101 26-JUL-1949	Levelled ridge and furrow is visible on vertical aerial photographs of 1949 as cropmarks.
						Cambridge University Collection of Aerial Photography RC8HH164 06-MAR-1985	Ridge and furrow is visible on vertical aerial photographs of 1985 as cropmarks. Truncated by railway line.
L42 (WADo81)	n/a	n/a	MD / PM	Ridge and furrow	E / LE	Cambridge University Collection of Aerial Photography RC8HH164 06-MAR-1985 / HS2 LiDAR 2012	A small patch of the ridge and furrow earthworks within this field was visible on vertical aerial photographs of 1985 but levelled by the time of the 2012 LiDAR. The earthworks in the remainder of the field remain extant.
					E / C	HS2 LiDAR 2012 / HS2 Vertical Photography SP7121 2012	Ridge and furrow is only just visible as faint earthworks across a series of paddocks on the south-east side of Woodlands Farm. Quite clearly visible on the 2012 vertical aerial photographs.
					E	Pan-Government Agreement SP7121 16-JUN-2003 / HS2 LiDAR 2012	Ridge and furrow is visible as faintly extant earthworks on aerial photography of 2003 and LiDAR of 2012.
L43	n/a	n/a	MD / PM	Ridge and furrow	E / LE	Cambridge University Collection of Aerial	A small area of ridge and furrow was visible on vertical aerial photographs of 1985 as extant earthworks; apparently

Aerial Survey ID	National record of the historic environment	HER reference	Period	Type	Evidence	Source	Description
						Photography RC8HH164 06-MAR-1985 / HS2 LiDAR 2012	levelled by the time of the 2012 LiDAR.
					E	HS2 LiDAR 2012	Ridge and furrow is very faintly visible as subtle earthworks within this field. Originally one large rectangular field, now bisected south-east/north-west by railway line.
L44	n/a	n/a	PM	Windmill mound	E	HS2 LiDAR 2012	A low, slightly oval mound is visible on LiDAR as an extant earthwork in the middle of this field. Sits on top of extant ridge and furrow. Possible post-medieval windmill mound, though origin and function are uncertain.

## 2.6 Results: interpretation

- 2.6.1 Forty-four possible archaeological features were recorded from the remote sensed imagery surveyed as part of this project.
- 2.6.2 The identified features are all likely to originate from the medieval or post-medieval periods, and relate mostly to agriculture (predominately ridge and furrow cultivation and former field boundaries).
- 2.6.3 The majority of the extant ridge and furrow earthworks recorded by the survey are grouped in the centre of Waddesdon and Quainton study area (features L26-28), on the south-eastern side of the deserted medieval village at Doddershall (discussed further below). There is also a considerable quantity of levelled ridge and furrow across CFA12 which was visible as cropmarks.
- 2.6.4 There is a noticeable absence of ridge and furrow towards the northern end of Waddesdon and Quainton study area. This is partly due to clay pits having been excavated over large areas of land in the vicinity of Sheephouse Wood. Ridge and furrow earthworks and cropmarks (recorded as feature L37) are visible on historic aerial photographs of this area taken before the expansion of the clay pits.
- 2.6.5 The remains of the deserted medieval settlement of Doddershall (feature Lo7, WADo63) lie to the north of Doddershall House, in the approximate centre of the study area. The deserted settlement is recorded by the HER (0034303000) and the national record of the historic environment (342837). The national record of the historic environment monument record polygon covers the field just to the north of Doddershall House, which is only around half the extent of the possible medieval earthworks recorded by the present survey.
- 2.6.6 The Doddershall settlement remains consist of an extensive spread of earthworks spanning the width of the study area. The earthworks may continue slightly further to the south-west and north-east, but they were not mapped beyond the study area boundary. The site is bisected by the existing railway line. The possible toft and croft boundaries, hollow ways and house platforms of the deserted settlement are clearly visible on the LiDAR coverage. Interpretation of these features is confused by the presence of numerous drainage ditches or channels which probably (but not certainly) post-date the settlement.
- 2.6.7 A pillow mound (feature Lo8, WADo63) lies between the deserted settlement remains and Doddershall House. The HER and national record of the historic environment have grouped this feature in the same monument record as the medieval settlement remains.
- 2.6.8 There are several possible post-medieval windmill mounds recorded within the study area (features L13 (WAD122), 14 (WADo68), 44), although the interpretation of these features is uncertain. Feature Lo6 (WADo39) is the most ambiguous of these mounds, and has been previously recorded as a Bronze Age round barrow, a medieval moated site, a post-medieval windmill mound and a Civil War defensive site<sup>21</sup>.

## 2.7 Conclusions

- 2.7.1 Forty-four individual or grouped possible archaeological features were identified by the survey, 41 of which are not recorded by either the HER or the national record of the historic environment.
- 2.7.2 The survey recorded earthworks associated with the deserted medieval settlement of Doddershall. These earthworks extended beyond the bounds of the former village as recorded by the national record of the historic environment, indicating that the settlement was considerably larger than originally thought. A pillow mound noted by the survey may be associated with the village.
- 2.7.3 The survey recorded large areas of ridge and furrow. Some of this ridge and furrow survived as well-preserved earthworks, particularly in the vicinity of Doddershall deserted medieval village.
- 2.7.4 The survey also recorded several field boundaries and possible post-medieval windmill mounds.

## 2.8 References

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<sup>21</sup> HER: 0033300000 / 0033301000; NRHE: 342718.

2.9 Historic aerial photographs consulted

Table 5: English Heritage vertical aerial photographs consulted for the remote sensing survey of the Waddesdon and Quainton study area

English Heritage library number	Original sortie number	Original frame number	Date taken
601	RAF/CPE/UK/2008	4089	16 April 1947
601	RAF/CPE/UK/2008	4090	16 April 1947
601	RAF/CPE/UK/2008	4091	16 April 1947
601	RAF/CPE/UK/2008	4092	16 April 1947
601	RAF/CPE/UK/2008	4093	16 April 1947
601	RAF/CPE/UK/2008	4094	16 April 1947
652	RAF/CPE/UK/2097	3062	28 May 1947
652	RAF/CPE/UK/2097	3063	28 May 1947
652	RAF/CPE/UK/2097	3064	28 May 1947
652	RAF/CPE/UK/2097	3065	28 May 1947
663	RAF/CPE/UK/2139	3295	03 June 1947
663	RAF/CPE/UK/2139	3296	03 June 1947
663	RAF/CPE/UK/2139	3297	03 June 1947
663	RAF/CPE/UK/2139	3298	03 June 1947
663	RAF/CPE/UK/2139	4235	03 June 1947
663	RAF/CPE/UK/2139	4236	03 June 1947
680	RAF/CPE/UK/2159	3040	13 June 1947
680	RAF/CPE/UK/2159	3063	13 June 1947
680	RAF/CPE/UK/2159	3064	13 June 1947
680	RAF/CPE/UK/2159	3065	13 June 1947
680	RAF/CPE/UK/2159	3105	13 June 1947
680	RAF/CPE/UK/2159	3106	13 June 1947
680	RAF/CPE/UK/2159	4105	13 June 1947
680	RAF/CPE/UK/2159	4106	13 June 1947
680	RAF/CPE/UK/2159	4107	13 June 1947
680	RAF/CPE/UK/2159	4108	13 June 1947
680	RAF/CPE/UK/2159	4109	13 June 1947
680	RAF/CPE/UK/2159	4140	13 June 1947
680	RAF/CPE/UK/2159	4141	13 June 1947
680	RAF/CPE/UK/2159	4142	13 June 1947

760	RAF/CPE/UK/2436	4112	04 February 1948
760	RAF/CPE/UK/2436	4113	04 February 1948
760	RAF/CPE/UK/2436	4114	04 February 1948
760	RAF/CPE/UK/2436	4115	04 February 1948
795	RAF/CPE/UK/2483	3149	10 March 1948
795	RAF/CPE/UK/2483	3150	10 March 1948
795	RAF/CPE/UK/2483	3151	10 March 1948
795	RAF/CPE/UK/2483	3266	10 March 1948
795	RAF/CPE/UK/2483	3267	10 March 1948
795	RAF/CPE/UK/2483	3268	10 March 1948
795	RAF/CPE/UK/2483	3269	10 March 1948
795	RAF/CPE/UK/2483	3270	10 March 1948
795	RAF/CPE/UK/2483	3271	10 March 1948
928	RAF/541/143	3229	24 August 1948
928	RAF/541/143	3230	24 August 1948
928	RAF/541/143	3231	24 August 1948
928	RAF/541/143	3232	24 August 1948
928	RAF/541/143	3233	24 August 1948
928	RAF/541/143	3235	24 August 1948
928	RAF/541/143	4233	24 August 1948
928	RAF/541/143	4234	24 August 1948
928	RAF/541/143	4235	24 August 1948
928	RAF/541/143	4236	24 August 1948
928	RAF/541/143	4237	24 August 1948
928	RAF/541/143	4238	24 August 1948
1061	RAF/541/479	3197	07 April 1950
1061	RAF/541/479	3211	07 April 1950
1061	RAF/541/479	3212	07 April 1950
1061	RAF/541/479	3213	07 April 1950
1061	RAF/541/479	3214	07 April 1950
1061	RAF/541/479	3238	07 April 1950
1061	RAF/541/479	3239	07 April 1950
1061	RAF/541/479	3240	07 April 1950



1061	RAF/541/479	3277	07 April 1950
1061	RAF/541/479	3278	07 April 1950
1061	RAF/541/479	4173	07 April 1950
1061	RAF/541/479	4213	07 April 1950
1061	RAF/541/479	4214	07 April 1950
1061	RAF/541/479	4215	07 April 1950
1061	RAF/541/479	4216	07 April 1950
1061	RAF/541/479	4240	07 April 1950
1061	RAF/541/479	4241	07 April 1950
1061	RAF/541/479	4242	07 April 1950
1061	RAF/541/479	4277	07 April 1950
1061	RAF/541/479	4278	07 April 1950
1061	RAF/541/479	4279	07 April 1950
1251	RAF/58/876	4013	21 May 1952
1251	RAF/58/876	4014	21 May 1952
2114	RAF/543/673	25	24 August 1959
2195	RAF/58/4627	365	16 August 1961
2195	RAF/58/4627	366	16 August 1961
2195	RAF/58/4627	367	16 August 1961
2195	RAF/58/4627	368	16 August 1961
2195	RAF/58/4627	369	16 August 1961
2195	RAF/58/4627	405	16 August 1961
2195	RAF/58/4627	406	16 August 1961
2195	RAF/58/4627	407	16 August 1961
2195	RAF/58/4627	408	16 August 1961
2195	RAF/58/4627	409	16 August 1961
2661	RAF/541/340	3003	26 July 1949
2661	RAF/541/340	3004	26 July 1949
2661	RAF/541/340	3005	26 July 1949
2661	RAF/541/340	3086	26 July 1949
2661	RAF/541/340	3087	26 July 1949
2661	RAF/541/340	3088	26 July 1949
2661	RAF/541/340	3100	26 July 1949

2661	RAF/541/340	3101	26 July 1949
2661	RAF/541/340	3102	26 July 1949
2661	RAF/541/340	3149	26 July 1949
2661	RAF/541/340	3150	26 July 1949
2661	RAF/541/340	4007	26 July 1949
2661	RAF/541/340	4008	26 July 1949
2661	RAF/541/340	4009	26 July 1949
2661	RAF/541/340	4088	26 July 1949
2661	RAF/541/340	4089	26 July 1949
2661	RAF/541/340	4103	26 July 1949
2661	RAF/541/340	4104	26 July 1949
2667	RAF/541/273	3038	21 June 1949
2667	RAF/541/273	3039	21 June 1949
2667	RAF/541/273	3040	21 June 1949
2670	RAF/541/272	4268	21 June 1949
2670	RAF/541/272	4269	21 June 1949
2670	RAF/541/272	4270	21 June 1949
9901	OS/76043	68	29 April 1976
9901	OS/76043	69	29 April 1976
9901	OS/76043	70	29 April 1976
9901	OS/76043	71	29 April 1976
9901	OS/76043	89	29 April 1976
9901	OS/76043	90	29 April 1976
9901	OS/76043	91	29 April 1976
9901	OS/76043	154	29 April 1976
9901	OS/76043	155	29 April 1976
9901	OS/76043	156	29 April 1976
9901	OS/76043	166	29 April 1976
9901	OS/76043	167	29 April 1976
9901	OS/76043	168	29 April 1976
9901	OS/76043	169	29 April 1976
9901	OS/76043	238	29 April 1976
9901	OS/76043	239	29 April 1976

9901	OS/76043	240	29 April 1976
9902	OS/76044	245	29 April 1976
9902	OS/76044	246	29 April 1976
11636	OS/67277	4	17 July 1967
12174	OS/75312	57	05 July 1975
12174	OS/75312	103	05 July 1975
12174	OS/75312	104	05 July 1975
12174	OS/75312	108	05 July 1975
12174	OS/75312	109	05 July 1975
12174	OS/75312	110	05 July 1975
12174	OS/75312	174	05 July 1975
12174	OS/75312	175	05 July 1975
12197	OS/75392	205	21 September 1975
12197	OS/75392	206	21 September 1975
12197	OS/75392	207	21 September 1975
12533	NMR/CAP/ZKNHN	99	14 January 1999
12533	NMR/CAP/ZKNHN	116	14 January 1999
12533	NMR/CAP/ZKNHN	117	14 January 1999
12533	NMR/CAP/ZKNHN	120	14 January 1999
12533	NMR/CAP/ZKNHN	121	14 January 1999

Table 6: English Heritage oblique aerial photographs consulted for the remote sensing survey of the Waddesdon and Quainton study area

English Heritage photo reference	Film number	Original frame number	Date taken
SP 7119 / 02	NMR 24807	/ 39	06 November 2007
SP 7119 / 03	NMR 24807	/ 40	06 November 2007
SP 7119 / 04	NMR 24807	/ 41	06 November 2007
SP 7119 / 05	NMR 24807	/ 42	06 November 2007
SP 7119 / 06	NMR 24807	/ 43	06 November 2007
SP 7119 / 07	NMR 24807	/ 44	06 November 2007
SP 7120 / 01	CAP 8154	/ 92	22 April 1954
SP 7120 / 02	CAP 8154	/ 93	22 April 1954
SP 7120 / 03	NMR 24807	/ 36	06 November 2007
SP 7120 / 04	NMR 24807	/ 37	06 November 2007

SP 7120 / 05	NMR 24807	/ 45	06 November 2007
SP 7219 / 01	NMR 24807	/ 47	06 November 2007
SP 7219 / 02	NMR 24807	/ 48	06 November 2007
SP 7219 / 03	NMR 24807	/ 49	06 November 2007
SP 7219 / 04	NMR 24808	/ 01	06 November 2007
SP 7219 / 05	NMR 24808	/ 02	06 November 2007
SP 7219 / 06	NMR 24808	/ 03	06 November 2007
SP 7219 / 07	NMR 24808	/ 04	06 November 2007
SP 7220 / 01	CAP 8154	/ 88	22 April 1954
SP 7220 / 02	CAP 8154	/ 89	22 April 1954
SP 7220 / 03	CAP 8154	/ 90	22 April 1954
SP 7220 / 04	CAP 8154	/ 91	22 April 1954
SP 7220 / 05	NMR 4203	/ 10	16 June 1987
SP 7220 / 06	NMR 4203	/ 11	16 June 1987
SP 7220 / 07	NMR 4203	/ 12	16 June 1987
SP 7220 / 08	NMR 11837	/ 02	16 June 1987
SP 7220 / 09	NMR 11837	/ 03	16 June 1987
SP 7220 / 10	NMR 11837	/ 05	16 June 1987
SP 7220 / 11	NMR 11837	/ 06	16 June 1987
SP 7220 / 12	NMR 11837	/ 08	16 June 1987
SP 7220 / 13	NMR 24807	/ 26	06 November 2007
SP 7220 / 14	NMR 24807	/ 27	06 November 2007
SP 7220 / 15	NMR 24807	/ 28	06 November 2007
SP 7220 / 16	NMR 24807	/ 29	06 November 2007
SP 7220 / 17	NMR 24807	/ 30	06 November 2007
SP 7220 / 18	NMR 24807	/ 31	06 November 2007
SP 7220 / 19	NMR 24807	/ 32	06 November 2007
SP 7220 / 20	NMR 24807	/ 33	06 November 2007
SP 7220 / 21	NMR 24807	/ 34	06 November 2007
SP 7220 / 22	NMR 24807	/ 35	06 November 2007
SP 7221 / 01	NMR 24807	/ 04	06 November 2007
SP 7221 / 02	NMR 24807	/ 12	06 November 2007
SP 7221 / 03	NMR 24807	/ 13	06 November 2007

SP 7221 / 04	NMR 24807	/ 14	06 November 2007
SP 7221 / 05	NMR 24807	/ 15	06 November 2007
SP 7221 / 06	NMR 24807	/ 16	06 November 2007
SP 7221 / 08	NMR 24807	/ 18	06 November 2007
SP 7221 / 09	NMR 24807	/ 19	06 November 2007
SP 7221 / 12	NMR 24807	/ 24	06 November 2007
SP 7221 / 13	NMR 24807	/ 25	06 November 2007
SP 7320 / 01	NMR 24807	/ 05	06 November 2007
SP 7320 / 02	NMR 24807	/ 06	06 November 2007

Table 7: Cambridge University Collection of Aerial Photography aerial photographs consulted for the remote sensing survey of the Waddesdon and Quainton study area

Cambridge University Collection of Aerial Photography catalogue number	Type	Date taken
ACV43	24/04/1961	Oblique
ACV44	24/04/1961	Oblique
BPM81	16/04/1974	Oblique
BPM82	16/04/1974	Oblique
CON40	11/07/1981	Oblique
CON41	11/07/1981	Oblique
CON42	11/07/1981	Oblique
CON43	11/07/1981	Oblique
CON44	11/07/1981	Oblique
CON45	11/07/1981	Oblique
CON46	11/07/1981	Oblique
CON47	11/07/1981	Oblique
CON48	11/07/1981	Oblique
CON49	11/07/1981	Oblique
CON50	11/07/1981	Oblique
CON51	11/07/1981	Oblique
CON52	11/07/1981	Oblique
CON53	11/07/1981	Oblique
CON54	11/07/1981	Oblique
NP88	22/04/1954	Oblique

NP89	22/04/1954	Oblique
NP90	22/04/1954	Oblique
NP91	22/04/1954	Oblique
NP92	22/04/1954	Oblique
NP93	22/04/1954	Oblique
NV13	26/04/1954	Oblique
NV14	26/04/1954	Oblique
NV15	26/04/1954	Oblique
NV16	26/04/1954	Oblique
RC8DV158	11/07/1981	Vertical
RC8DV159	11/07/1981	Vertical
RC8DV160	11/07/1981	Vertical
RC8DV161	11/07/1981	Vertical
RC8DV162	11/07/1981	Vertical
RC8EL106	02/06/1982	Vertical
RC8EL107	02/06/1982	Vertical
RC8HH049	06/03/1985	Vertical
RC8HH050	06/03/1985	Vertical
RC8HH099	06/03/1985	Vertical
RC8HH100	06/03/1985	Vertical
RC8HH101	06/03/1985	Vertical
RC8HH162	06/03/1985	Vertical
RC8HH163	06/03/1985	Vertical
RC8HH164	06/03/1985	Vertical
RC8HH210	06/03/1985	Vertical
RC8HH211	06/03/1985	Vertical
RC8HH212	06/03/1985	Vertical
RC8HI215	12/03/1985	Vertical
ZknHM99	14/01/1999	Vertical
ZknHM115	14/01/1999	Vertical
ZknHM116	14/01/1999	Vertical
ZknHM117	14/01/1999	Vertical
ZknHM119	14/01/1999	Vertical

ZknHM120	14/01/1999	Vertical
ZknHM121	14/01/1999	Vertical
ZknHN99	14/01/1999	Vertical
ZknHN115	14/01/1999	Vertical
ZknHN116	14/01/1999	Vertical
ZknHN117	14/01/1999	Vertical
ZknHN119	14/01/1999	Vertical
ZknHN120	14/01/1999	Vertical
ZknHN121	14/01/1999	Vertical

2.10      **Figures**

CH-004-12.01	Remote sensing survey interpretation	1:5,000
CH-004-12.02	Remote sensing survey interpretation	1:5,000
CH-004-12.03	Remote sensing survey interpretation	1:5,000
CH-004-12.04	Remote sensing survey interpretation	1:5,000
CH-004-12.05	Remote sensing survey interpretation	1:5,000
CH-004-12.06	Remote sensing survey interpretation	1:5,000
CH-004-12.07	Remote sensing survey interpretation	1:5,000
CH-004-12.08	Remote sensing survey interpretation	1:5,000
CH-004-12.09	Remote sensing survey interpretation	1:5,000

# 3 Fieldwalking surveys

## 3.1 Site KBoAD(E): Fleet Marston

### Introduction

- 3.1.1 On 2–18 April 2013 an archaeological fieldwalking survey was carried out at a site near Fleet Marston Farm, Buckinghamshire (site code: KBoAD; centred on national grid reference: SP 7749 1557; Figure CH-004-12.10).
- 3.1.2 The site was separated into five areas (A–E; Figure CH-004-12.11). The site's westernmost field (Field 7, Area E) was within the Waddesdon and Quainton study area (CFA12) and is the subject of this report; the main body of the site was within the Stoke Mandeville and Aylesbury study area (CFA11) and is reported on in Volume 5: Appendix CH-004-011.
- 3.1.3 The objective of the survey was to provide further information on the archaeological potential of the survey site.
- The site*
- 3.1.4 The survey site lies in rural land on the southern side of the A41, on the opposite side of the road to Fleet Marston Farm (Figure CH-004-12.10).
- 3.1.5 Area E encloses approximately 6.2ha. At the time of the survey, it comprised a pastoral field, with boundaries marked by ditches, hedgelines and modern fencing. The field displays a gentle rise to the north.
- 3.1.6 The site's bedrock geology is recorded as mudstones of the Kimmeridge and Ampthill Clay Formations. These sedimentary bedrocks formed in the Jurassic Period (145–200 million years ago), in shallow seas<sup>22</sup>.
- 3.1.7 Where recorded, the site's superficial deposits comprise Mid Pleistocene Till and Head deposits. These clays, silts, sands and gravels formed up to two million years ago, in the Quaternary Period<sup>23</sup>.

### Summary historic/archaeological background

- 3.1.8 The following information is summarised from the records of the Buckinghamshire County HER.
- 3.1.9 A small Roman town lay at Fleet Marston, which is some 1.8km east of the survey site. Large quantities of Roman artefacts have been retrieved from the area. The projected line of Roman Akeman Street, which passed through Fleet Marston on its route between Cirencester and St. Albans, runs within approximately 75m of the southern limit of the survey site (Figure CH-004-12.11).
- 3.1.10 Fleet Marston is also the former site of a medieval village. This settlement declined during the 15th century and was eventually deserted.

### Methodology

- 3.1.11 The fieldwalking survey was carried out in accordance with a written scheme of investigation<sup>24</sup>. It was also in line with guidance issued by the Institute for Archaeologists<sup>25</sup> and English Heritage<sup>26</sup>.
- 3.1.12 The survey site was sub-divided into five areas (A–E) and the individual fields were numbered (1–7; Figure CH-004-12.11). This report deals with Area E (Field 7) only.
- 3.1.13 A series of eight transects was established within the survey field, using a Leica Smart Rover Global Positioning System (GPS). Transects were spaced at 20m intervals. They were tied in to the OS grid and assigned alphabetic identifiers (A–H; Figure CH-004-12.12).
- 3.1.14 The fieldwalking team walked the length of the transects. A 2m-wide corridor centred on each individual transect was observed as a basis for artefact collection.
- 3.1.15 The length of each transect was subdivided into a series of 20m stints. Artefacts recovered from each individual stint were bagged together.
- 3.1.16 There was provision for artefacts considered by the survey team to be of special archaeological interest to be located individually using a Leica Smart Rover GPS. No such artefacts were recovered, however.
- 3.1.17 There was also provision for detailed fieldwalking at a greater resolution in areas where find concentrations were noted. It was decided in the field, however, that there was no need for such intensification of survey.
- 3.1.18 All artefacts were collected, with the exception of any materials positively identified as modern. Any large concentrations of certain materials such as stone, slag and tile were sampled only.

### Limitations

- 3.1.19 The effectiveness of fieldwalking surveys can be dependent on a number of factors, including land use, topography and weather conditions. Surveys are generally most effective on land which has been ploughed and where the ground surface is clearly visible, as these ground conditions facilitate movement of artefacts to the surface and aid subsequent artefact identification and retrieval.
- 3.1.20 Area E was under pasture, with thick grass cover. It had not been ploughed. As such, its survey suitability was limited.

### Assumptions

- 3.1.21 The survey methodology assumes that all of the fieldwalking team are equally skilled and experienced. Less experienced fieldwalkers may recover fewer artefacts than their colleagues, creating artificial gaps in the artefact plots.

<sup>22</sup> British Geological Survey; Geology of Britain Viewer; [http://maps.bgs.ac.uk/geology\\_viewer\\_google/googleviewer.html](http://maps.bgs.ac.uk/geology_viewer_google/googleviewer.html); Accessed: 28 February 2013.

<sup>23</sup> British Geological Survey; Geology of Britain Viewer; [http://maps.bgs.ac.uk/geology\\_viewer\\_google/googleviewer.html](http://maps.bgs.ac.uk/geology_viewer_google/googleviewer.html); Accessed: 28 February 2013.

<sup>24</sup> Cotswold Archaeology, (2013), *HS2, Buckinghamshire: Written Scheme of Investigation for an Archaeological Fieldwalking Survey*.

<sup>25</sup> Institute for Archaeologists, (2008), *Standard and Guidance for Archaeological Field Evaluation*.

<sup>26</sup> English Heritage, (1991), *Management of Archaeological Projects 2*, English Heritage, Swindon  
English Heritage, (2006), *Management of Research Projects in the Historic Environment (MoRPHE): Project Manager's Guide*, English Heritage, Swindon

- 3.1.22

There is a general assumption that surface concentrations of artefactual material overlie and originate from below-ground archaeological remains. It should be noted, however, that processes such as manuring and ploughing can spread artefacts over a wide area and as such, surface artefacts may not always denote the presence of archaeological sites. Nevertheless, it is considered that the greater the concentration of artefacts, the less likely it is to have been redeposited by such processes.
- 3.1.23

It is often assumed that the higher the quantity of recovered artefacts, the more extensive the corresponding below-ground archaeological remains. The converse of this is that if no (or only very limited) artefacts are recovered, then it is assumed that there are no below-ground archaeological remains at the survey site. It should be noted, however, that different types of archaeological sites produce different quantities of artefactual material: for example, a medieval site may be associated with considerably more artefacts than an early prehistoric site, and a settlement site may produce more material than a ritual site which saw activity only during festivals. The limitations of fieldwalking surveys should also be borne in mind: the amount of artefacts recovered can be dependent upon a number of environmental and land-use factors.
- Results: description**
- 3.1.24

A brief description of each of the main periods/categories of recovered artefact is given below, followed by a more detailed report on the finds. The artefact distributions are depicted on Figures CH-004-12.12 to CH-004-12.14.
- Prehistoric (pre–AD 43): worked flint and pottery (Figure CH-004-12.12)*
- 3.1.25

Four pieces of worked flint were recovered. This material comprise:
  - three waste flakes, without secondary working or evidence for utilisation; and
  - a single core fragment.
- 3.1.26

None of the worked flints are closely dateable.
- Medieval (AD 1066–1539): pottery and ceramic building material (Figure CH-004-12.13)*
- 3.1.27

A total of 14 sherds of medieval pottery were recovered. This material was present within the northern and central areas of Field 7, with no real sub-clusters or patterns.
- 3.1.28

Medieval roof tile weighing 19g was retrieved from a single stint in the north-eastern part of Field 7.
- Post-medieval/modern (AD 1540–present): pottery, ceramic building material and slag (Figure CH-004-12.14)*
- 3.1.29

A total of 25 sherds of post-medieval/modern pottery was retrieved, most of which dates buttocks to the 18th and 19th centuries. There were broad concentrations of this material in the northern and eastern parts of the field.
- 3.1.30

A total of 2,238g of post-medieval/modern ceramic building material was recovered, the bulk of which comprises fragments of flat tile. This material was widely dispersed across the survey area, with no clear patterns or trends.

The finds

- 3.1.31

The following is a detailed report on the artefactual material recovered from the site during the fieldwalking survey.
- 3.1.32

The surface-collected finds were recorded directly to a Microsoft Access database and their locations were plotted using ARCVIEW GIS software. All pottery was quantified by sherd count and weight according to period, and a note was made of fabrics or vessel forms where discernible. Prehistoric worked flint was quantified by count and class (flakes/cores/tools) and ceramic building material was recorded by period group and weight. The finds are discussed below according to period and category.
- Prehistoric worked flint*
- 3.1.33

Four pieces of worked flint were recovered. All occur in unpatinated dark grey flint with moderate to severe edge damage. Most pieces (three) are waste flakes without secondary working or evidence for utilisation, although a single flake core fragment was recorded. None of this material is closely dateable.
- Prehistoric worked flint: distribution*
- 3.1.34

This group of worked flints is small and is unlikely to signify anything greater than ‘background noise’ relating to unspecific, transitory earlier prehistoric activity.
- Medieval pottery*
- 3.1.35

A total of 14 sherds (67g) of medieval pottery were recorded. This material is heavily fragmented and most sherds are abraded.
- Medieval pottery: range*
- 3.1.36

The pottery assemblage comprises mainly unglazed coarsewares types (11 sherds), in particular reduced types (mqz, seven sherds), which are probably a mix of Hertfordshire greywares and Brill/Boarstall products. The Brill/Boarstall kilns, approximately 10km from to the west of the site, are more certainly the source for unglazed oxidised wares (mox, one sherd; mwh, one sherd) and glazed jugs (mbril, three sherds). Dating for this material can be expected to span the 13th to 15th centuries. Identifiable vessel forms among the unglazed sandy types are mainly jars with ‘developed’ everted rims and some bowls. A number of jug handle sherds occur in fabric mbril; these are typically of rod form and display decorative stabbing. Some sherds in this fabric feature ungerglaze slip-trailed decoration typical of the 13th and early 14th centuries. Two sherds of unglazed cooking pot-type fabrics occur in limestone-tempered type (mli). The dating for this type extends earlier than for the sandy types, lying in the 11th/12th to 13th/14th centuries range. A factor affecting the limited incidence of these types may be their tendency to be lower-fired and potentially less durable when exposed within the ploughsoil.
- Medieval pottery: distribution*
- 3.1.37

The medieval pottery was spread through the northern and central parts of Field 7. There were no real sub-clusters or patterns, and it is possible that this material was deposited through processes such as manuring.

*Medieval tile*

- 3.1.38 A small quantity of ceramic tile, tentatively identified as roof tile of medieval date, was recovered from one stint within the north-eastern part of Field 7. The material comprises flat tile in a yellow orange fabric, measuring approximately 10–15mm in thickness.

*Post-medieval/modern pottery*

- 3.1.39 Post-medieval and later pottery amounting to 25 sherds (278g) was retrieved from Field 7. This group comprises mainly internally-glazed or unglazed earthenwares, English stonewares and refined whitewares (including creamwares and Mocha type wares). Most is considered to date across the late post-medieval and modern periods (18th/19th centuries). There were broad concentrations of this material in the northern and eastern parts of the field.

*Post-medieval/modern ceramic building material*

- 3.1.40 Ceramic building material of post-medieval/modern type represents the most common and widely-dispersed artefact type, amounting to 2,238g. The large bulk of this category comprises fragments of flat tile, typically 15–20mm in thickness and occurring in a hard, red-firing sandy fabric.
- 3.1.41 The post-medieval and later ceramic building material was widely dispersed across the survey area. There is no evidence of tile production from the assemblage, and the pattern of distribution may have resulted from the subsequent dispersal of material dumped for improvement of drainage or traction.

**Results: interpretation**

- 3.1.42 The very small assemblage of worked flint recovered from the site is unlikely to signify anything greater than 'background noise' relating to non-specific earlier prehistoric activity.
- 3.1.43 There was no evidence associated with Roman Akeman Street or Fleet Marston Roman town, which might suggest that activity associated with the thoroughfare and settlement did not extend as far as Area E.
- 3.1.44 The medieval material retrieved from the site is likely to have resulted from manuring. The spread of post-medieval/modern artefacts recovered from across the site was probably deposited in order to improve drainage or traction.
- 3.1.45 The generally negative result of the survey must, however, be viewed in the context of the unsuitability of the site for fieldwalking survey. As such, in the case of site KBoAD(E), it is considered that the survey results are unreliable, and absence of evidence does not necessarily mean absence of below-ground archaeological remains.

**Conclusions**

- 3.1.46 The survey recorded no evidence for archaeological activity at the site. The site survey conditions were poor, however, and as such the survey result may not be reliable.

**3.2 References**

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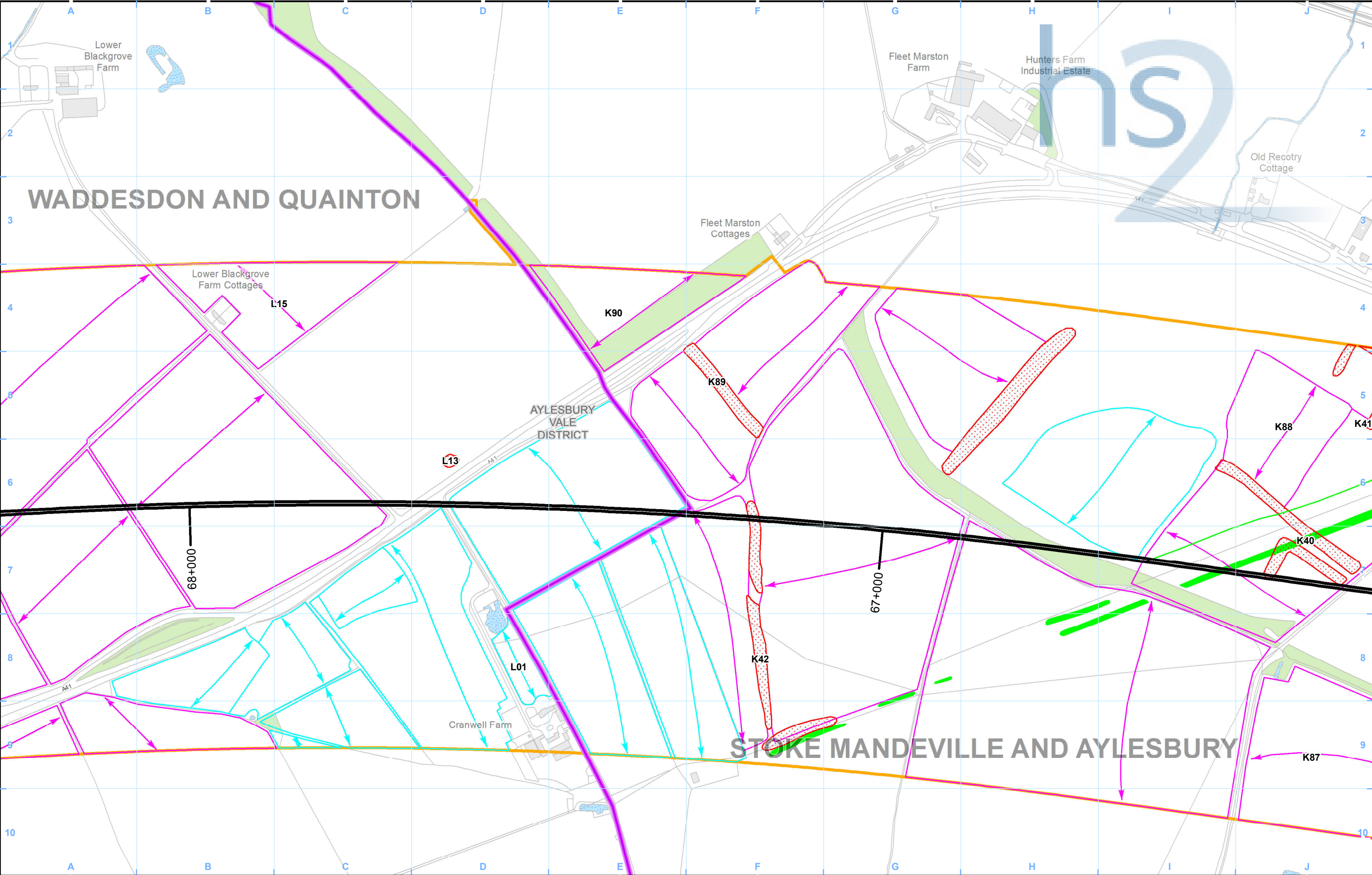
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**3.3 Figures**

CH-004-12.10	KBoAD(E): Site location plan	1:25,000
CH-004-12.11	KBoAD(E): The site, showing survey fields and areas	1:10,000
CH-004-12.12	KBoAD(E): Prehistoric finds	1:500
CH-004-12.13	KBoAD(E): Medieval finds	1:500
CH-004-12.14	KBoAD(E): Post-medieval/modern finds and undated metal slag	1:500





**Legend**

Route in tunnel	Remote sensing survey boundary	<b>Archaeological features</b>	Extent of Area
Route on surface		Bank	Bank
Community forum boundary		Ditch	Ditch
District/Borough boundary		Extant ridge and furrow direction	Extant ridge and furrow outline
Watercourse		Levelled ridge and furrow direction	Levelled ridge and furrow outline
Water body		Structure	Structure
Woodland		T-Hachure	Large cut feature

**Location Map**

Map Number: CH-004-12.01

Map Name: Remote Sensing Survey Interpretation

Community Forum Area CFA12: Waddesdon & Quainton

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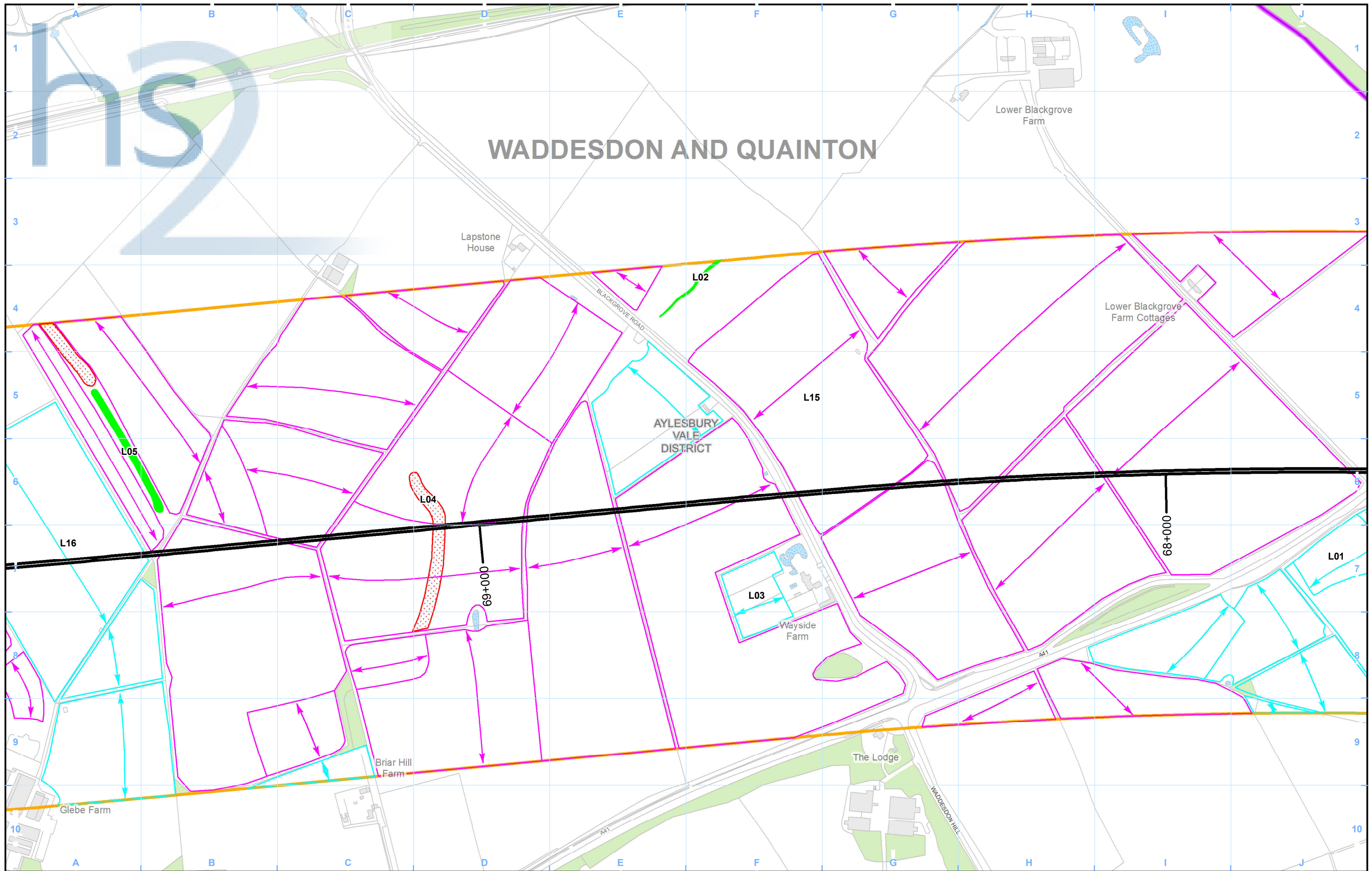
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**Legend**

Route in tunnel	Remote sensing survey boundary	<b>Archaeological features</b>	Extent of Area
Route on surface		Bank	Bank
Community forum boundary		Ditch	Ditch
District/Borough boundary		Extant ridge and furrow direction	Extant ridge and furrow outline
Watercourse		Levelled ridge and furrow direction	Levelled ridge and furrow outline
Water body		Structure	Structure
Woodland		T-Hachure	Large cut feature

**Location Map**

Map Number: CH-004-12.02

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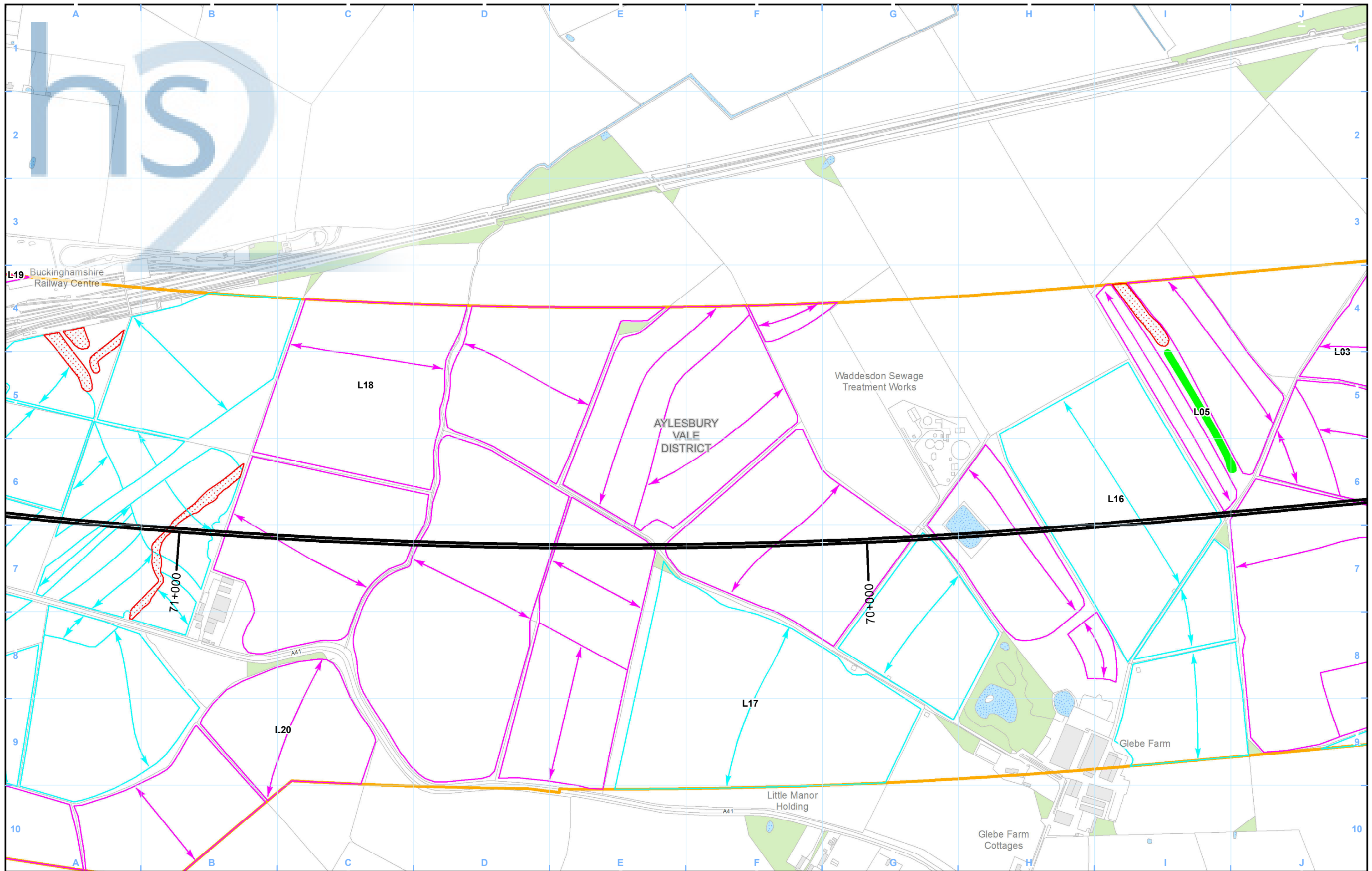
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Date: 06/09/13





**Legend**

Route in tunnel	Remote sensing survey boundary	<b>Archaeological features</b>	Extent of Area
Route on surface		Bank	Bank
Community forum boundary		Ditch	Ditch
District/Borough boundary		Extant ridge and furrow direction	Extant ridge and furrow outline
Watercourse		Levelled ridge and furrow direction	Levelled ridge and furrow outline
Water body		Structure	Structure
Woodland		T-Hachure	Large cut feature

**Location Map**

Map Number: CH-004-12.03

Map Name: Remote Sensing Survey Interpretation

Community Forum Area CFA12: Waddesdon & Quainton

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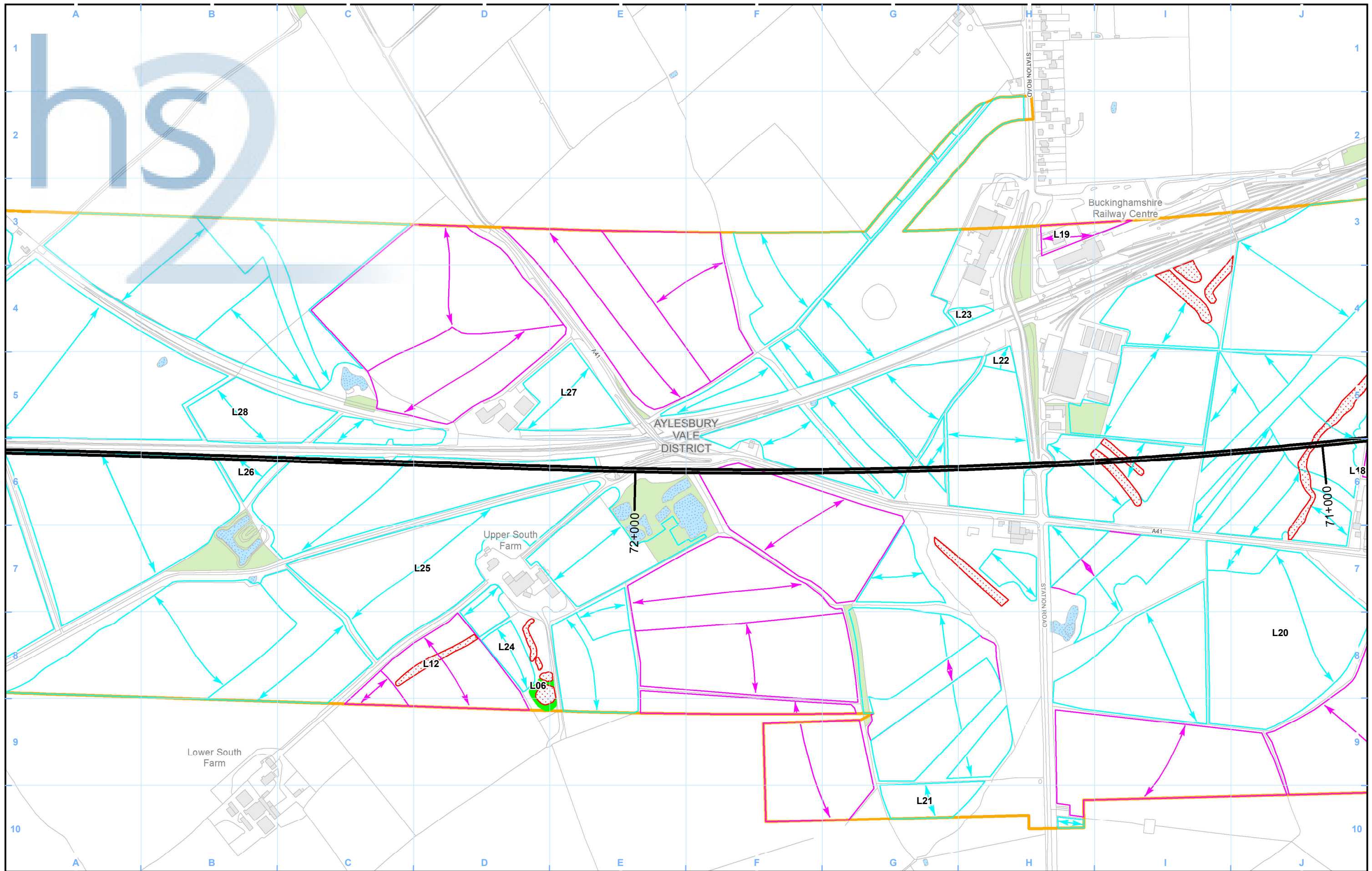
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Date: 06/09/13

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**Legend**

Route in tunnel	Remote sensing survey boundary	<b>Archaeological features</b>
Route on surface		Bank
Community forum boundary		Ditch
District/Borough boundary		Extant ridge and furrow direction
Watercourse		Levelled ridge and furrow direction
Water body		Structure
Woodland		T-Hachure

Extent of Area	Bank
Ditch	Extant ridge and furrow outline
Levelled ridge and furrow outline	Structure
Large cut feature	

**Location Map**

Map Number  
**CH-004-12.04**

Map Name  
**Remote Sensing Survey Interpretation**

Community Forum Area CFA12:  
Waddesdon & Quainton

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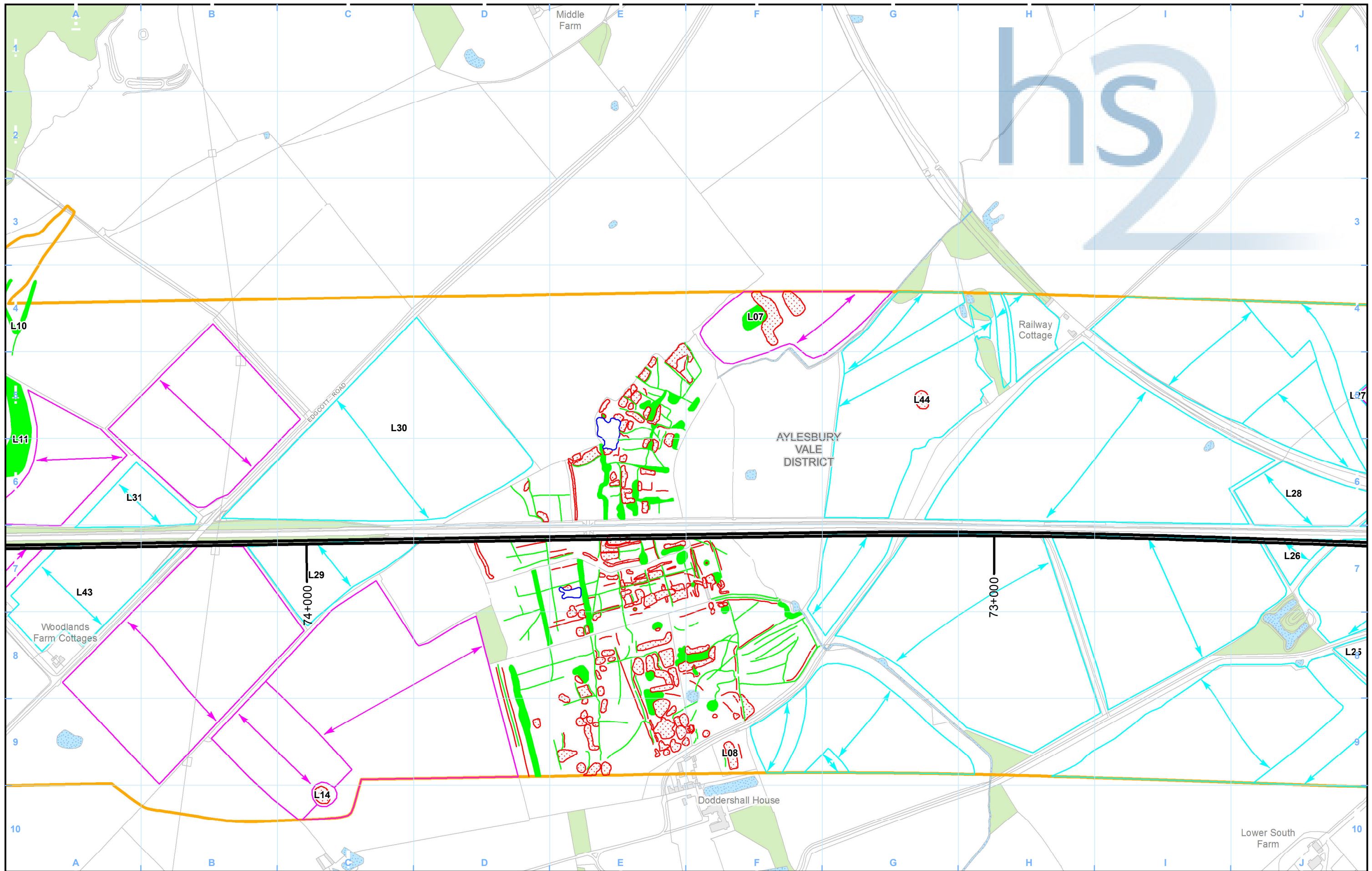
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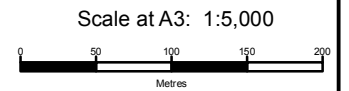
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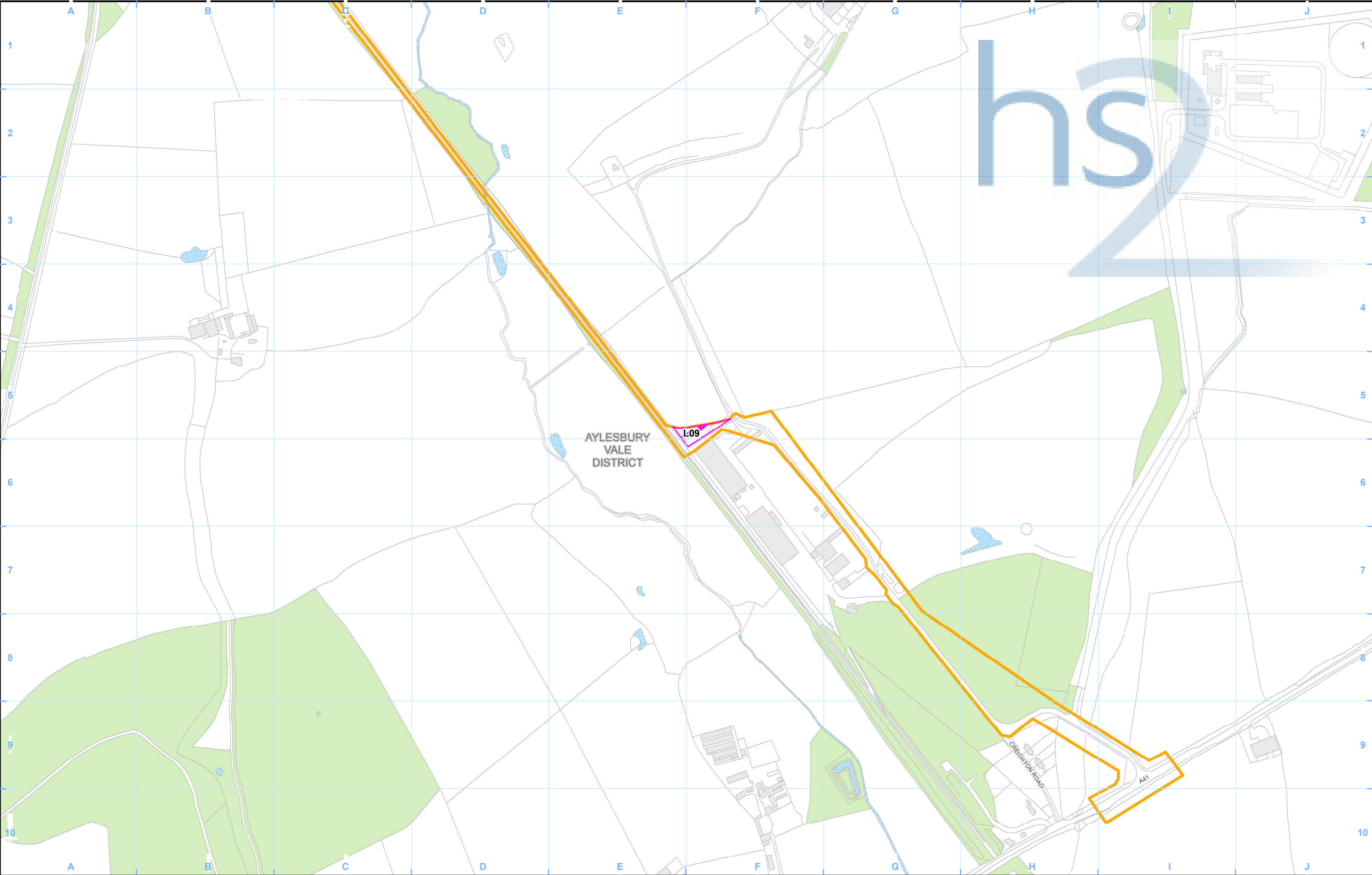
Date: 06/09/13





<b>Legend</b> Route in tunnel Route on surface Community forum boundary District/Borough boundary Watercourse Water body Woodland	<b>Remote sensing survey boundary</b> Archaeological features Bank Ditch Extant ridge and furrow direction Levelled ridge and furrow direction Structure T-Hachure	<b>Extent of Area</b> Bank Ditch Extant ridge and furrow outline Levelled ridge and furrow outline Structure Large cut feature	<b>Location Map</b> 	<b>Map Number</b> CH-004-12.05 <b>Map Name</b> Remote Sensing Survey Interpretation Community Forum Area CFA12: Waddesdon & Quainton	 ETM accept no responsibility for any circumstances, which arise from the reproduction of this map after alteration, amendment or abbreviation or if it is issued in part or issued incomplete in any way. © Crown copyright and database rights 2013. Ordnance Survey Licence Number 100049190. Doc Number: C252-ETM-EV-MAP-020-002589-P03.00 Date: 06/09/13
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**Legend**

Route in tunnel

Route on surface

Community forum boundary

District/Borough boundary

Watercourse

Water body

Woodland

Remote sensing survey boundary

**Archaeological features**

Bank

Ditch

Extant ridge and furrow direction

Levelled ridge and furrow direction

Structure

T-Hachure

Extent of Area

Bank

Ditch

Extant ridge and furrow outline

Levelled ridge and furrow outline

Structure

Large cut feature

**Location Map**

Map Number

CH-004-12.06

Map Name

Remote Sensing Survey Interpretation

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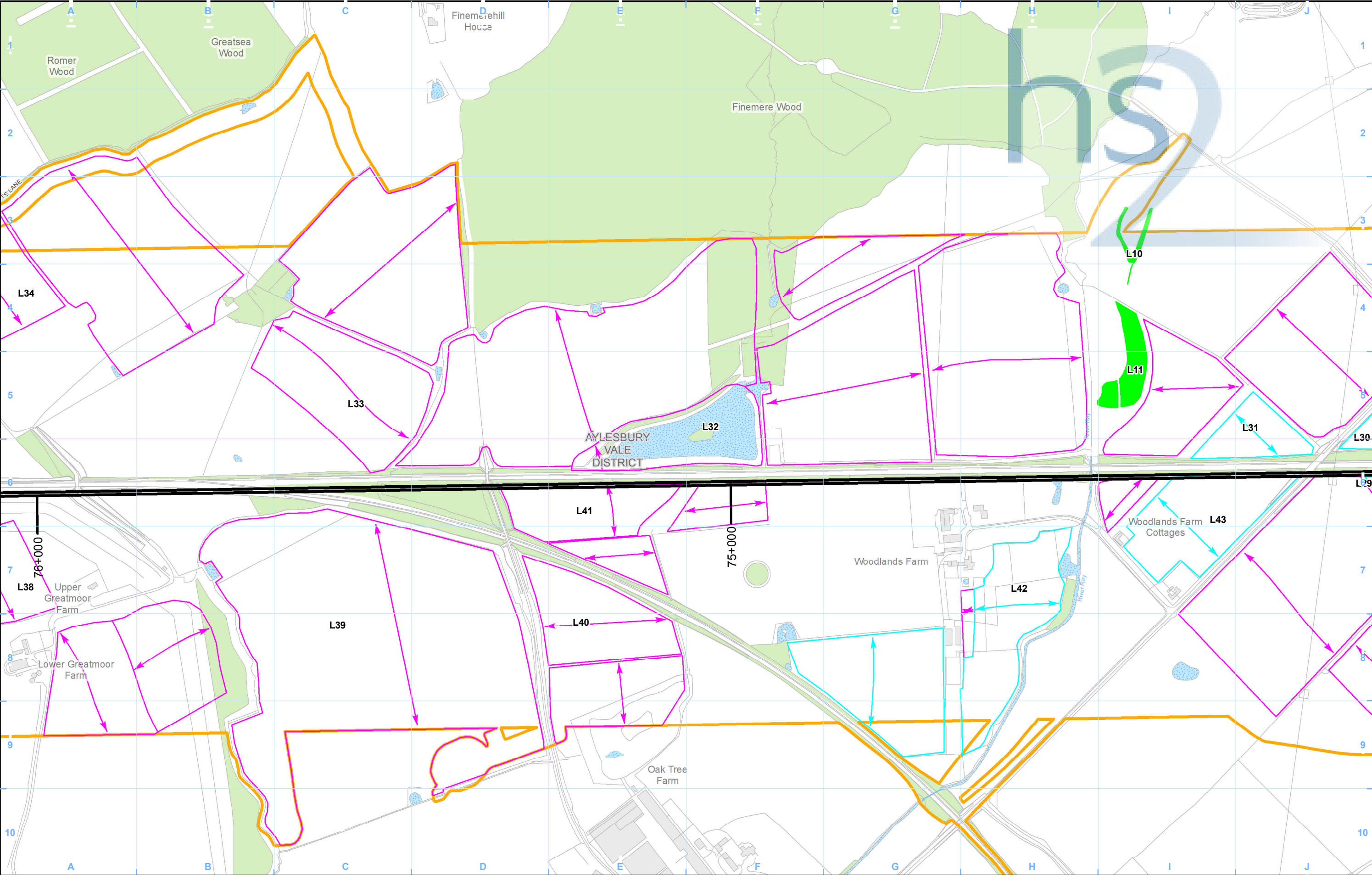
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**Legend**

Route in tunnel

Route on surface

Community forum boundary

District/Borough boundary

Watercourse

Water body

Woodland

Remote sensing survey boundary

**Archaeological features**

Bank

Ditch

Extant ridge and furrow direction

Levelled ridge and furrow direction

Structure

T-Hachure

Extent of Area

Bank

Ditch

Extant ridge and furrow outline

Levelled ridge and furrow outline

Structure

Large cut feature

**Location Map**

Map Number  
**CH-004-12.07**

Map Name  
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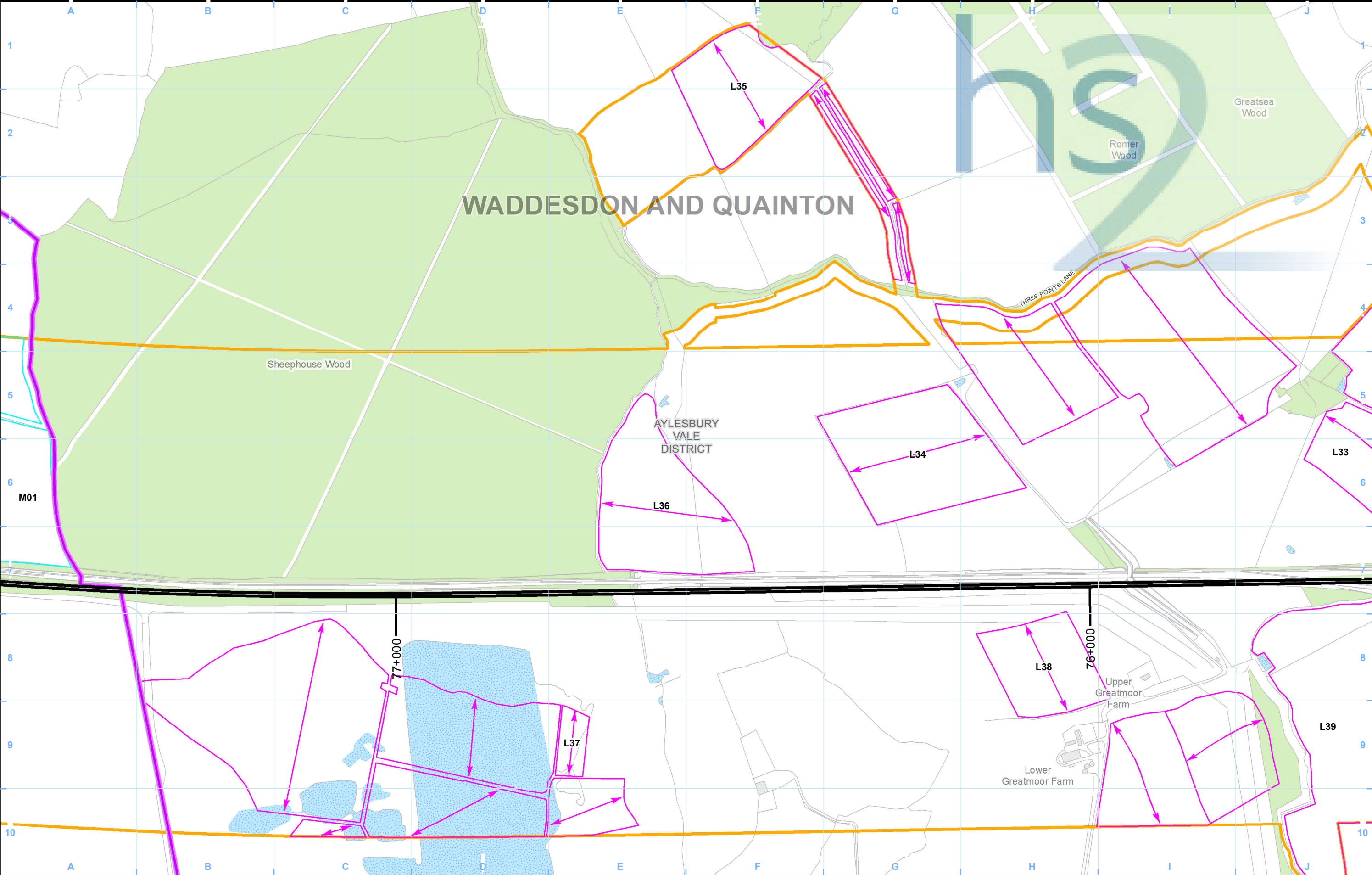
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Date: 06/09/13





**Legend**

Route in tunnel	Remote sensing survey boundary	Archaeological features	Extent of Area
Route on surface		Bank	Bank
Community forum boundary		Ditch	Ditch
District/Borough boundary		Extant ridge and furrow direction	Extant ridge and furrow outline
Watercourse		Levelled ridge and furrow direction	Levelled ridge and furrow outline
Water body		Structure	Structure
Woodland		T-Hachure	Large cut feature

**Location Map**

Map Number: CH-004-12.08

Map Name: Remote Sensing Survey Interpretation

Community Forum Area CFA12: Waddesdon & Quainton

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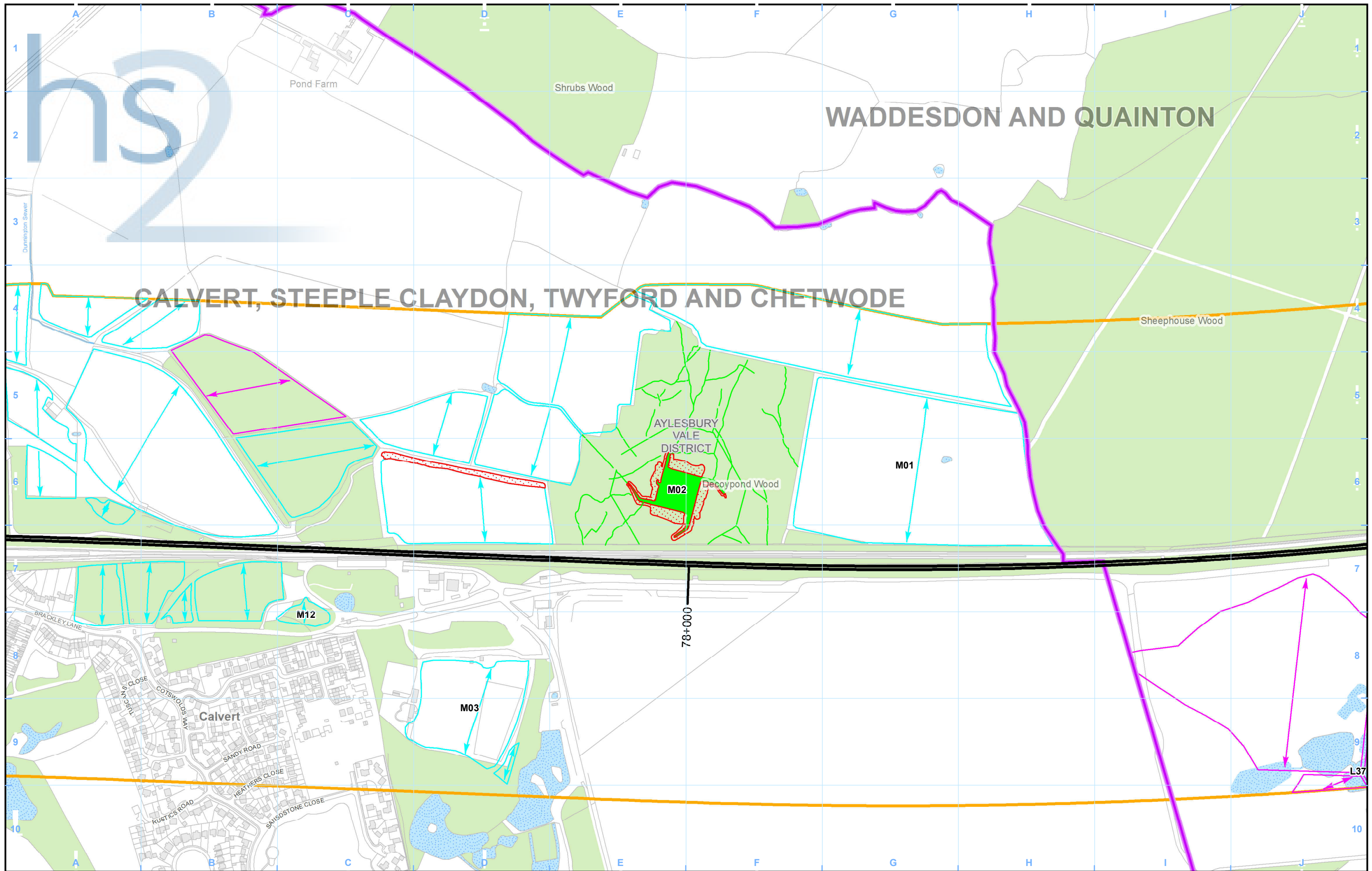
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**Legend**

Route in tunnel	Remote sensing survey boundary	<b>Archaeological features</b>
Route on surface		Bank
Community forum boundary		Ditch
District/Borough boundary		Extant ridge and furrow direction
Watercourse		Levelled ridge and furrow direction
Water body		Structure
Woodland		T-Hachure

Extent of Area	Bank
Ditch	Extant ridge and furrow outline
Levelled ridge and furrow outline	Structure
Large cut feature	

**Location Map**

Map Number: CH-004-12.09

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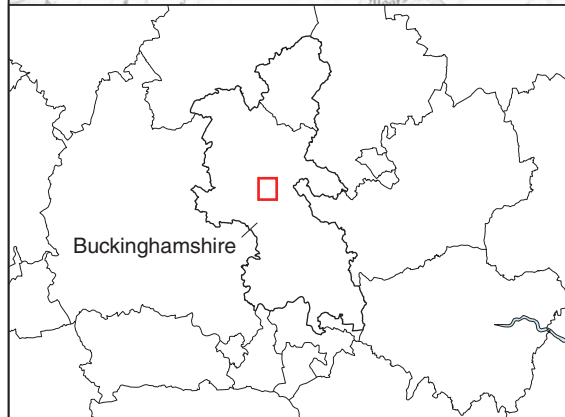
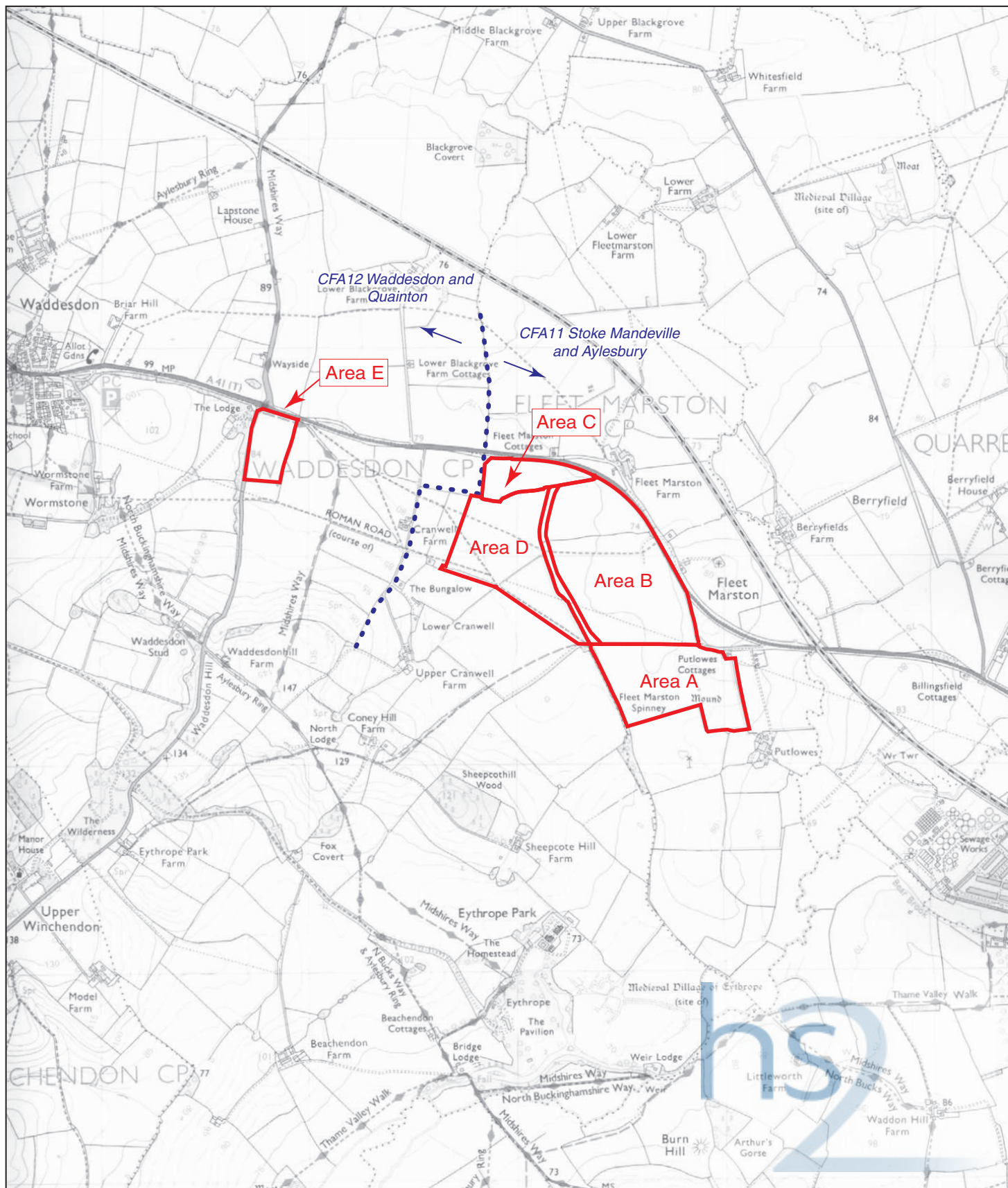
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..... Community Forum boundary (CFA)

0 1km

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**PROJECT TITLE**

Site KB0AD: Land near Fleet Marston Farm, Buckinghamshire

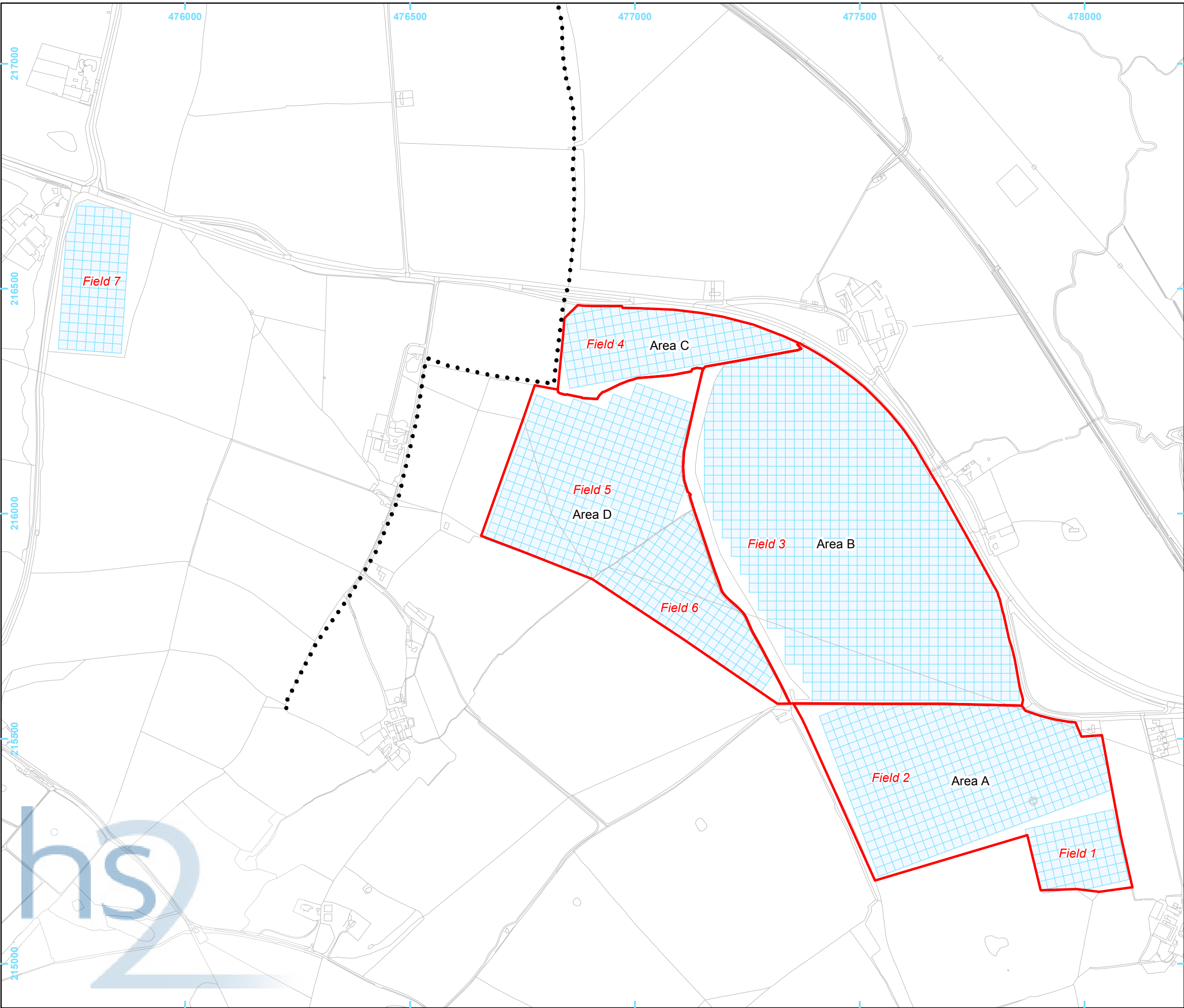
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


**KB0AD(E): Fieldwalking survey. Site location plan**

PROJECT NO. 660122 DATE 25-09-2013  
DRAWN BY JB REVISION 00  
APPROVED BY PJM SCALE@A4 1:25,000

FIGURE NO.

**CH-004-12.10**



-  site
-  areas subject to fieldwalking
-  transect lines
-  CFA



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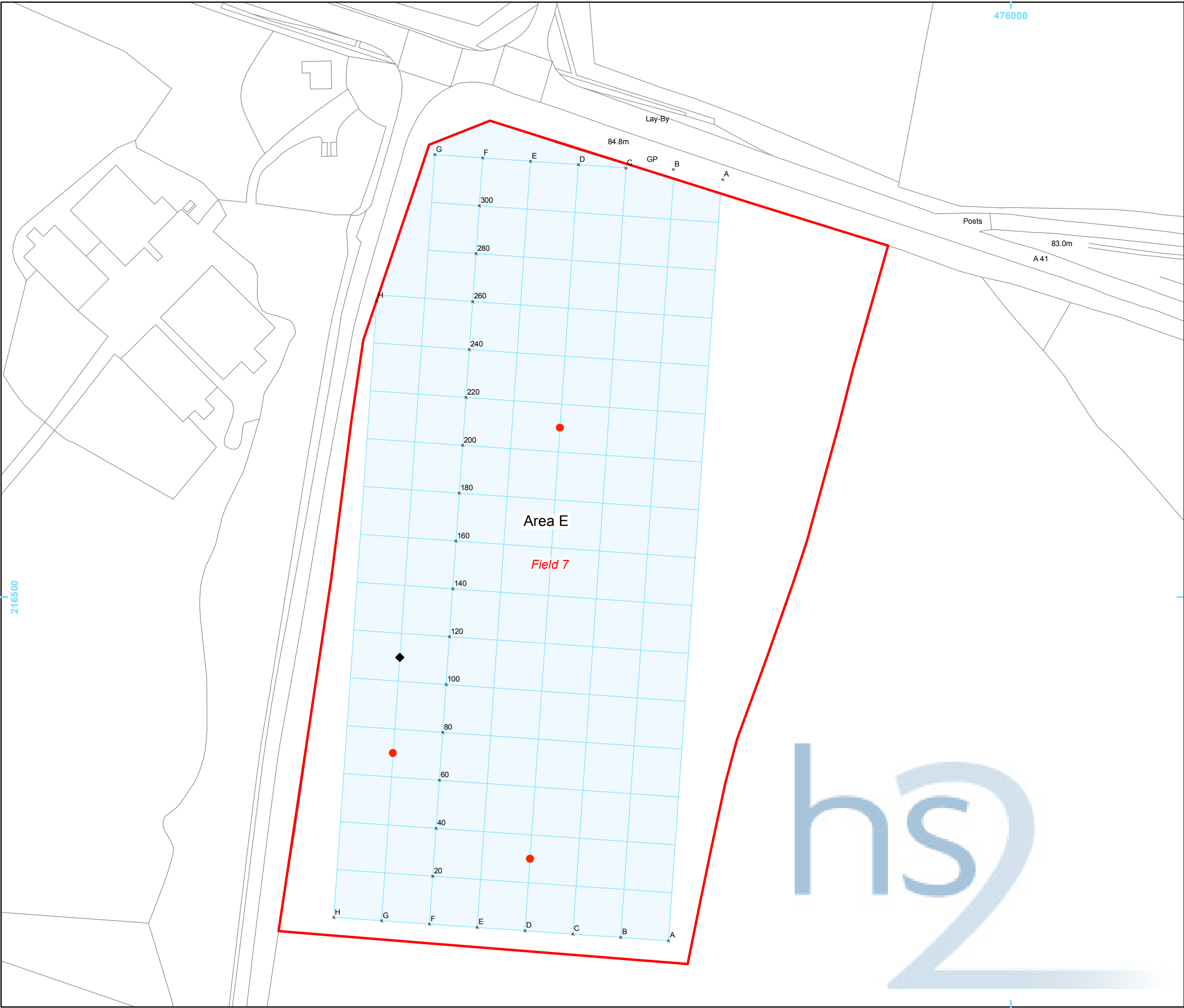
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**PROJECT TITLE**  
Site KB0AD(E): Land near Fleet  
Marston Farm, Buckinghamshire

**FIGURE TITLE**  
KB0AD(E): Fieldwalking survey. The site,  
showing survey fields and areas

PROJECT NO.	660122	DATE	25-09-2013	FIGURE NO.
DRAWN BY	JB	REVISION	00	
APPROVED BY	PJM	SCALE@A3	1:8,000	CH-004-12.11





- site
- areas subject to fieldwalking
- transect lines

- flint core - count
- 1
- flint flake - count
- 1



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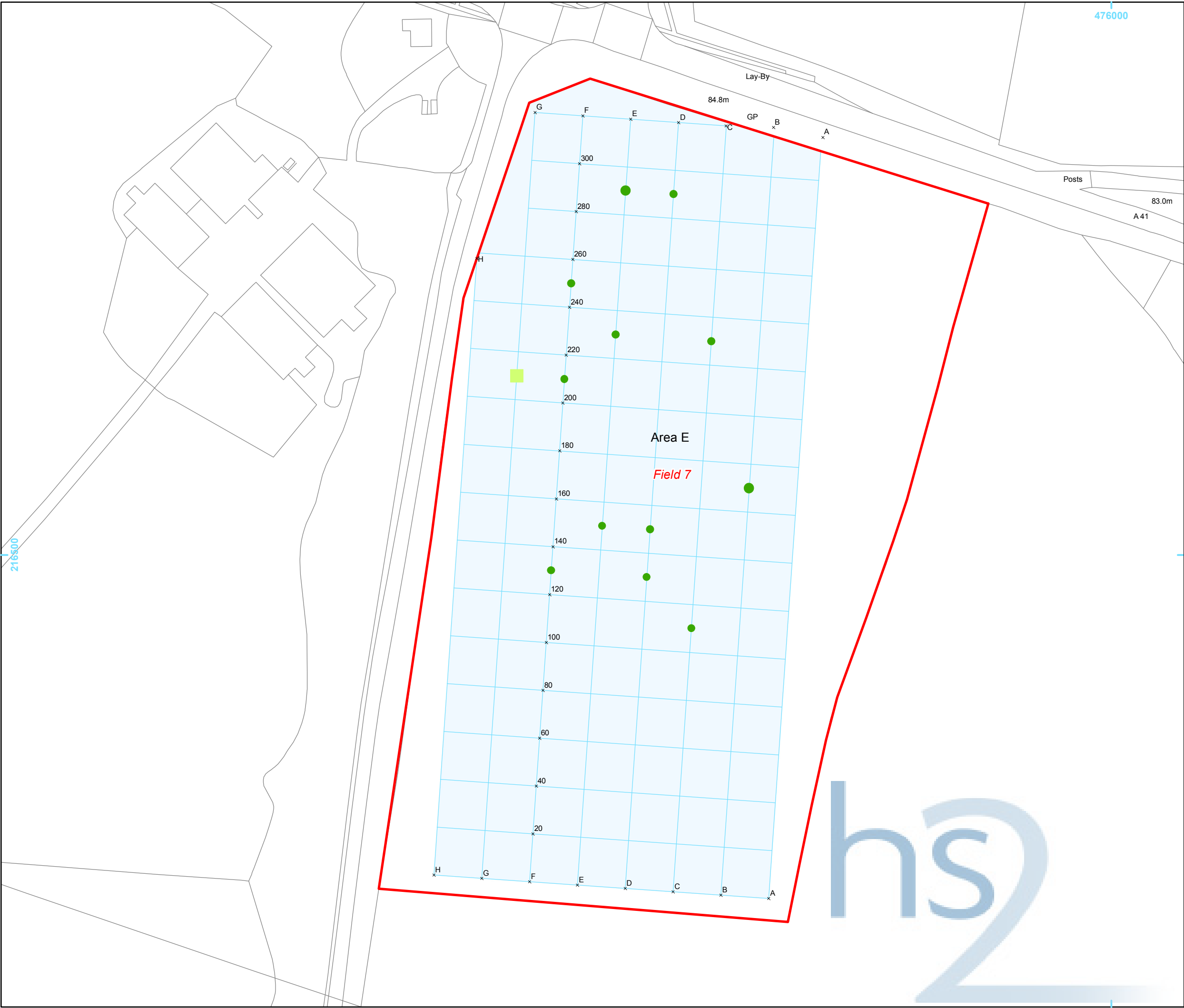
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PROJECT TITLE  
Site KB0AD(E): Land near Fleet Marston Farm, Buckinghamshire

FIGURE TITLE  
KB0AD(E): Fieldwalking survey. Prehistoric finds

PROJECT NO. 660122	DATE 25-09-2013	FIGURE NO.
DRAWN BY JB	REVISION 00	
APPROVED BY PJM	SCALE@A3 1:1,500	CH-004-12.12



- site
- areas subject to fieldwalking
- transect lines

medieval pottery - count

- 1
- 2

medieval cbm - by weight (g)

- 19

0 50m

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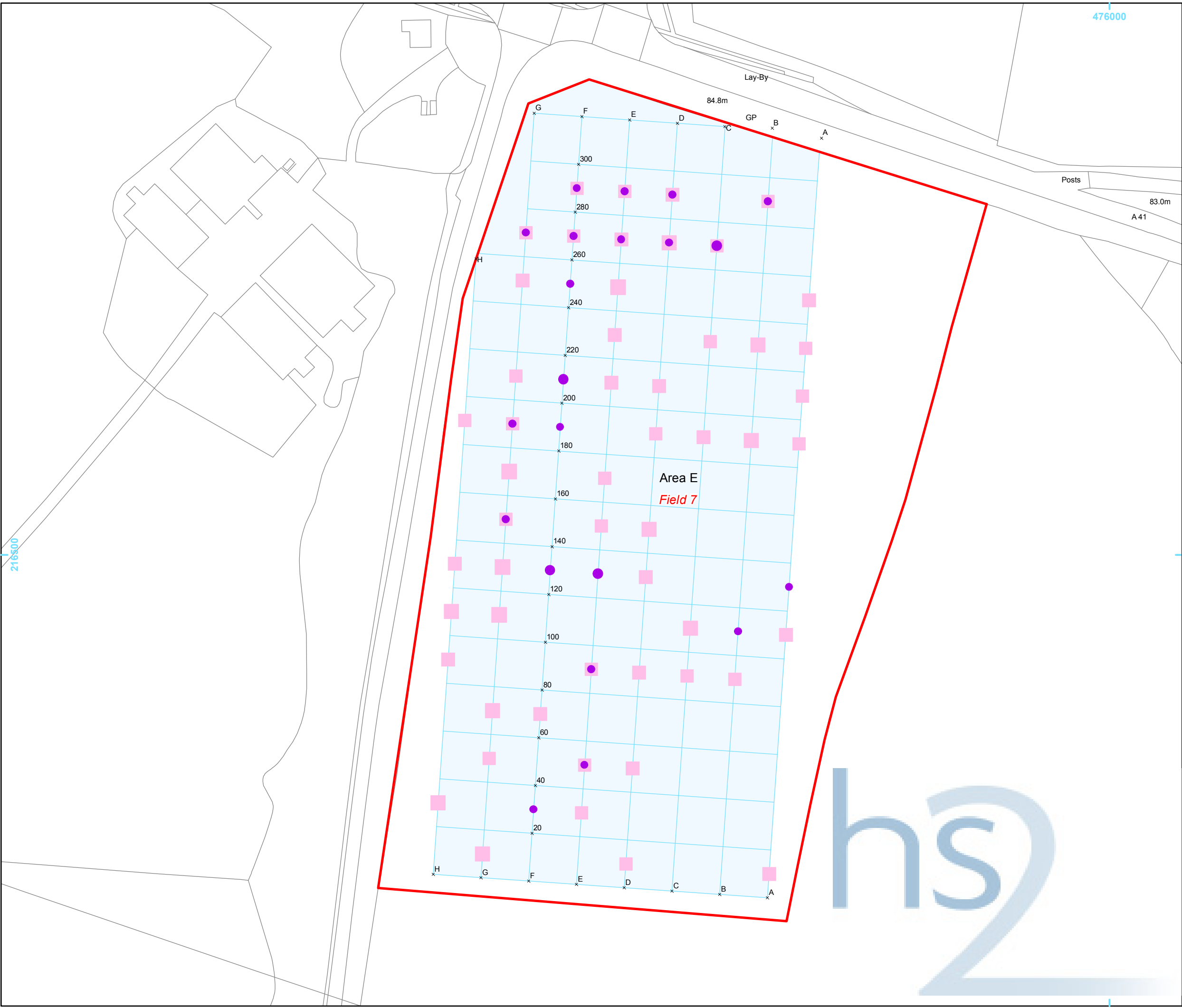


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PROJECT TITLE  
Site KB0AD(E): Land near Fleet Marston Farm, Buckinghamshire

FIGURE TITLE  
KB0AD(E): Fieldwalking survey.  
Medieval finds

PROJECT NO. 660122 DATE 25-09-2013 FIGURE NO.  
DRAWN BY JB REVISION 00  
APPROVED BY PJM SCALE@A3 1:1,500 CH-004-12.13



- site
- areas subject to fieldwalking
- transect lines

post-medieval/modern pottery - count

- 1
- 2

post-medieval/modern cbm - weight (g)

- 5 - 30
- 31 - 56
- 57 - 83
- 84 - 137



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enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE  
Site KB0AD(E): Land near Fleet Marston Farm, Buckinghamshire

FIGURE TITLE  
KB0AD(E): Fieldwalking survey.  
Post-medieval/modern finds